University of Alberta

# The Development and Validation of a Time Management Instrument for Exercise Adoption, Participation, and Adherence

by

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of the requirements for the degree of Doctor of Philosophy

in

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**In Voltaire's *Zadig* or *The Book of Fate*, the Grand Magnus proposed the following:**

> **"What is the longest and yet the shortest Thing in the World; the most swift and the most slow; the most divisible, and the most extended; the least valu'd, and the most regretted; And without which nothing can possibly be done: Which, in a Word, devours every Thing how minute soever, and yet gives Life and Spirit to every Object or Being however Great?"**

**Zadig pronounced the answer to be "Time"**

> **"Nothing," said he, "can be longer, since 'tis the Measure of Eternity; Nothing is shorter, since there is Time always wanting to accomplish what we aim at. Nothing passes so slowly as Time to him who is in Expectation; and nothing so swift as Time to him who is in the perfect Enjoyment of his Wishes. Its extent is to Infinity, in the whole; and divisible to Infinity in part. All Men neglect it in the Passage; and all regret the loss of it when 'tis past. Nothing can possibly be done without it; it buries in Oblivion whatever is unworthy of being transmitted down to Posterity; and it renders all illustrious Actions immortal."**

**This dissertation is dedicated to my family.**

I dedicate this work to my son Braeden. As I watch you grow and learn to do new things, I know that nothing I accomplish from this day forward will ever equal the accomplishments you have been experiencing almost daily. To walk, to talk, to throw a ball. I am truly humbled. I love you my little son.

To my husband Peter. This wild road I took (dragged) you on is over. Now we can get back to our normal lives (whatever that is). Thanks for letting me drive you crazy in my neglect of you, our home(s), the cats, and Braeden. Thank-you for supporting me and my career path. I think it's finally your turn to choose the path we travel. As Mark Twain said, "Twenty years from now you will be more disappointed by the thing you didn't do than by the ones you did do, so throw off the bowlines. Sail away from the safe harbour. Catch the trade winds in your sails. Explore. Dream. Discover."

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**I love you all.**

# Abstract

The most prevalent self-reported explanation for inactive lifestyles is lack of time. Lack of time for exercise may be the result of poor time management skills. There are no published time management for exercise assessment tools. The purpose of this study was to develop and collect validity evidence for a time management scale for exercise (TIMES). An initial pool of 91 items was developed from existing time management literature resulting in 13 items for each of 7 subscales: Exercise Documentation, Exercise Priorities, Exercise Scheduling, Exercise Organization, Awareness of Time and Exercise Suitability, Setting Exercise Goals, and Exercise Time Management Preferences and Emotions. Ten exercise/health psychologists judged each of the items in terms of relevance and representativeness. Simultaneously, 509 undergraduate students completed the 91 item scale. The judgmental analysis resulted in 49 items meeting all item relevance criteria. Exploratory factor analysis (principal axis followed by direct oblimin, $\Delta=0$) revealed an interpretable 4 factor, 32-item solution. Twenty-four items (75%) identified as relevant by the judges significantly loaded on one of the 4 factors. Each of the 4 factors was comprised of at least 7 items with internal consistency values ranging from 0.72 to 0.91. In order to maximize content relevance and representativeness and maintain a minimum of 8 items per subscale, 5 supplementary items provided by the experts were added to the TIMES resulting in a total of 37 TIMES items. A second empirical field study was conducted with 430 undergraduate students. In order to provide evidence of replication, this sample was further divided into 2 subsamples. Neither the 37-item nor the 32-item TIMES was confirmed to fit the data in either of the subsamples but an interpretable 29-item factor pattern emerged from exploratory factor analysis: Exercise Importance (8 items, $\hat{\alpha}=0.91$), Exercise Documentation (8 items, $\hat{\alpha}=0.92$), Setting Exercise Goals (8 items, $\hat{\alpha}=0.89$), and Perceived Ability to Manage Time for Exercise (5 items, $\hat{\alpha}=0.68$). Additional validity evidence showed the TIMES to be significantly related to exercise behavior, stage of change for exercise, and the theory of planned behavior.

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# CHAPTER ONE

## Introduction and Rationale for Study

The prevention of chronic diseases through regular physical activity can improve individual quality of life and help control rapidly rising health care costs (Canadian Fitness and Lifestyle Research Institute, [CFLRI], 1998a). Physical inactivity is the primary causal factor in about one-third of Canadian deaths due to coronary heart disease, colon cancer, and non-insulin dependent diabetes. According to the *Economic Burden of Illness in Canada* (Health Canada, 1997), the promotion of physical activity in Canada is a significant investment: In 1993, a 10% reduction in the number of inactive Canadians would have resulted in a 5 billion dollar health care saving (Health Canada, 1997).

Physical activity is positively correlated with numerous physiological health benefits (Bo-abbas et al., 2002; Centers for Disease Control and Prevention, 2004; Colditz, 1999; Colditz, Cannuscio, & Frazier, 1997; Friednreich, 2001; Manson et al., 2002; Manson et al., 1999; Matthews et al., 2002; Pate et al, 1995; Pritchard et al., 2003; Pronk, Goodman, O'Connor, & Martinson, 1999; Rhind, Shek, Shinkai, & Shephard, 1994) and psychological wellness (Brown & Siegel, 1988; Crews & Landers, 1987; McMahon, 1990; North, McCullagh, & Tran, 1990; Petruzello, Landers, Hatfield, Kubitz, & Salazar, 1991; Thomas, Landers, Salazar, & Etnier, 1994). Participation in physical activity also has indirect health benefits. It is estimated that 50% of what is currently accepted as aging, such as increased body fat, decreased strength, and reduced cognitive functioning, are due to sedentary lifestyles (Drinkwater, 1985; Mazzeo et al., 1998). Physical activity is one of the simplest and most cost-effective methods of achieving the objective of a physically and psychologically healthier population (CFLRI, 1999).

## *Physical Activity Recommendations and Sedentary Rates*

Canada's Physical Activity Guide, produced by Health Canada and the Canadian Society for Exercise Physiology, recommends that adults accumulate 60 minutes of mild intensity physical activity every day of the week or 30 minutes of moderate intensity physical activity four days per week (Health Canada and Canadian Society for Exercise Physiology, 1998).

Despite the abundance of documented evidence supporting the relationship between physical activity and health benefits, one in ten Canadians are sedentary (CFLRI, 1996a) and 64% of Canadians 18 years of age or older are not physically active enough to improve their physical functioning or to increase their longevity (CFLRI, 1999). Canadian youth and children also experience sedentary problems. Three out of five children and youth aged 5 to 17 years are not active enough for optimal growth and development (CFLRI, 1998a). Gender related differences in physical activity are also apparent among children and adolescents (CFLRI, 1998a), the 18 to 24 year age group, and the over 65 year age group (CFLRI, 1999), with more males than females being physically active in each age group. Unfortunately, regardless of gender, as Canadians get older their activity levels decrease.

## *Exercise Adherence*

In addition to low physical activity participation rates, there are also physical activity and exercise adherence problems. Approximately 50% of the individuals who initiate a structured exercise program drop out within the first six months (Dishman, 1988). Problems with physical activity and exercise adherence have been identified with children, university students, the middle aged, and the elderly as well as in primary prevention, secondary prevention, and work-site settings (Robinson & Rogers, 1994).

Despite low physical activity and exercise participation and adherence rates, 90% of Canadians believe that physical activity is important to their overall health (CFLRI, 1997). Moreover, many Canadians feel that physical activity is important to their personal, family, social, and community lives (CFLRI, 1998b).

### *Theory of Planned Behavior*

One theoretical framework that can be applied to exercise participation and adherence is the theory of planned behavior (TPB). The TPB asserts that individuals will intend to carry out a behavior when they think positively about the behavior, when their significant others think they should carry out the behavior, and when the individuals themselves perceive the behavior to be under their control (Ajzen, 1988). Within the framework of physical activity, perceived behavioral control can be characterized as an individual's perceived barriers to physical activity (Dishman, 1988; Dishman, Sallis, & Orenstein, 1985). Thus, the inconsistencies between the beliefs Canadians possess towards physical activity and their subsequent rates of physical activity participation and adherence can be studied from the perspective of the TPB in general and their perceived barriers to physical activity in particular.

### *Perceived Lack of Time*

Lack of time or time pressure is the most prevalent self-reported reason that North American adults provide as to why they drop-out of supervised clinical and community exercise programs (Dishman, 1990, 1991; Dishman et al., 1985) and for inactive lifestyles (Dishman, 1990, 1991; Dishman et al., 1985; CFLRI, 1996a). Furthermore, lack of time as a perceived barrier to physical activity or exercise has been reported by children, youth (CFLRI, 1999), and high school students (Shaw, Kleiber, & Caldwell, 1995; Tappe, Duda, & Ehrnwald, 1989). Lack of time as a barrier to physical activity or exercise does not differ across genders (CFLRI, 1996a), and individuals 65 years of age or older were the only survey participants who did not identify lack of time as the most significant barrier to physical activity (CFLRI, 1996a). Overall, researchers have suggested that there is a need for a training program in physical activity and exercise related time management strategies for adolescents and adult populations (Dishman et al., 1985; Tappe et al., 1989).

### *Time Management Skills and Behaviors*

Although there has been an epidemic of time management training in the last 20 years (Quirk, 1989), time management has been defined in many different ways. For example, time management has been described as the process by which an individual more effectively accomplishes tasks and goals (Schuler, 1979), as having balance, flexibility, and control over your time (Lakein, 1973), and as setting priorities and scheduling tasks (Jordan, Cobb, & McCully, 1989). Recent time management research has moved away from industry and organizations toward education and health, specifically studies of students (Bocchi, Eastman, Owens, & Swift, 2004; Keim & Strickland, 2004; Zinatelli, Dube, & Jovanovic, 2002) and individuals with diabetes (Wdowik, Kendall, Harris, & Auld, 2001).

The specific time management skills and behaviors consistently identified in the literature include (a) time analysis, (b) planning, (c) goal setting, (d) prioritizing, (e) scheduling, (f) organizing, and (g) establishing new and improved time habits (Barkas, 1984; Feeny Jonson, 2002; Jorde, 1982; Lakein, 1973; Mackenzie, 1972, 1975, 1990; Morris, 2001; Woolfolk & Woolfolk, 1986).

### *Time Analysis*

Current behaviors need to be analyzed for specific occurrences of inefficient time management (Soucie, 1986; Stevens & Pfost, 1984), time limitations, sources and patterns of procrastination, and compatibility between available time and the time requirements of chosen target activities.

### *Planning*

Planning can be defined as providing individuals with the means of testing alternative actions without actually evoking the physical resources or social and personal expenses necessary to engage in the action (Smith, 1999). Planning can reduce stress by relieving the *time crunch* (Bliss; 1976; Morris, 2001; Stevens & Pfost, 1984). By planning first and then relaxing, an individual is capable of accomplishing much more in an allotted time period.

### *Goal Setting*

Goal setting behaviors should attempt to include the setting of personal, long term, short term, specific, challenging, realistic, measurable, and flexible goals which should be put in writing (Blanchard & Johnson, 1981; Schuler, 1979; Soucie, 1986).

### *Prioritization*

Priorities can be defined as goals and objectives that have been ranked in order of importance (Mackenzie, 1990). When setting priorities, both the long range importance of the task and the short-term urgency of the task (Mackenzie, 1990) need to be considered. Prioritization includes the acknowledgement of the importance of the target task relative to other activities, and the inclusion of target tasks as a priority for the week and month (Ashkenas & Schaffer, 1974; Mackenzie, 1972, 1975, 1990; Rice, 1984; Schuler, 1979; Simpson, 1978; Stevens & Pfost, 1984). Individuals should attempt to be disciplined in respecting their established priorities while minimizing distractions from other situations (Soucie, 1986).

### *Scheduling*

Scheduling allows for the possibility of prediction and the resolution of temporal uncertainty (McGrath & Rotchford, 1983; Schriber & Gutek, 1987). Target tasks should be scheduled consistently, be set monthly or weekly, and be set in advance. The traditional tools for organizing a day are an engagement calendar that schedules dates and a *to do list* that itemizes activities (Taylor & Mackenzie, 1986).

### *Organizing*

Organization is a process (Morris, 2001). Being well organized saves time and energy and gives individuals a sense of control. Organizational techniques include managing commitments appropriately so that time is not underestimated or overcommitted (Stevens & Pfost, 1984), being aware of energy levels, organizing self so arrivals are not late or too early, being prepared, and avoiding procrastination (Morris, 2001).

### *Establishing New and Improved Time Habits*

New time management behaviors may be developed through the location of additional minutes each day (e.g., by waking up earlier in the morning) (Rice, 1984; Stevens & Pfost, 1984) or established through improved organization such as time conservation (e.g., use of form letters) (Schuler, 1979), efficient time use (e.g., reading and answering e-mail at one time), and partitioning of target tasks (e.g., completing sections of a large project). Time habits may also be improved by monitoring, recording, and documenting time, and through the use of notes, to do lists, calendars, diaries, logs, and day-timers.

## *Time Management Research*

Research findings have shown that different populations appear to utilize similar time management techniques such as time manipulation, task delegation, prioritization, synchronization and routinization of activities, reallocation of personal time, goal setting, agenda making, and the utilization of time diaries (Hessing, 1994; Winter, Puspitawati, Heck, & Stafford, 1993; Yoels & Clair, 1994). In general, results from empirical studies have shown that the use of time management behaviors leads to more effective performance and that perceived control over time is a very important aspect of time management. Self-reports of time management have been shown to be related to academic achievement, age, and gender (Britton & Tesser, 1991; Lahmers & Zulauf, 2000; Simons & Galotti, 1992). Good time managers appear to prefer planning and organization (Williams, Verble, Price, & Layne, 1995). Individuals who have previous time management training also appear to engage more frequently in time management behaviors (Britton & Tesser, 1991; Macan, 1994; 1996; Macan, Shahani, Dipboye, & Phillips, 1990; Orpen, 1993; Simons & Galotti, 1992; Williams et al., 1995; Woolfolk & Woolfolk, 1986). However, there is currently an absence of research examining time management in the physical activity and exercise domains.

### *Assessing Time Management for Exercise*

In order to assess individuals' use of time management for physical activity and exercise, their need for an intervention, and in order to evaluate the effectiveness of such interventions, a time management assessment tool is required. Although time management scales exist in other domains (e.g., academic, industrial, management), many lack adequate psychometric properties (Macan et al., 1990). Furthermore, the behaviors and skills related to time management for exercise appear to be specific to the domain of exercise (Hellsten, 1999). Despite the abundance of research regarding lack of time as a perceived barrier to exercise for both adults and adolescents, there is currently no published exercise time management assessment tool.

## Purpose of Study

There is a lack of research examining the influence of time management upon the initiation and maintenance of exercise. Concomitant with this lack of research, there currently is no established assessment instrument to measure time management in relation to exercise adoption, participation, and adherence. Thus, the purpose of this study was to develop a time management for exercise assessment scale, hereafter referred to as the TIMES, and to gather validity evidence for the inferences made from this instrument. The focus of the dissertation was fourfold: (a) to specify the domain of exercise related time management, (b) to develop a pool of items, (c) to gather validity evidence for the item pool, and, therefore, the domain to which the items are referenced, and (d) to select and collect empirical validity evidence for the final set of items that comprise the TIMES. More specifically, the following sequentially ordered questions were addressed:

1. What is the nature and structure of the domain of exercise-related time management?
2. Given the structure of the domain, what is the content-related evidence of validity for the items referenced to each subdomain identified in the answer to question 1?
3. What is the reliability of the scales referenced to each subdomain?
4. What evidence of validity is there for the scales?

## Definition of Terms

For the purposes of this study, the following definitions were adopted.

### *Active Living*

A way of life in which physical activity is valued and incorporated into daily life (CFLRI, 1997).

### *Cardiorespiritory Fitness*

The ability of the body's circulatory and respiratory systems to supply fuel during sustained physical activity (U.S. Department of Health and Human Services, 1996).

### *Exercise*

A subset of physical activity that is a planned, structured, and repetitive; bodily movement done to improve or maintain one or more components of physical fitness – cardiorespiritory fitness, muscular strength, muscular endurance, flexibility, and body composition (Caspersen, Powell, & Christensen, 1985; U.S. Department of Health and Human Services, 1996).

### *Inactivity*

Not engaging in any regular pattern of physical activity beyond daily functioning (U.S. Department of Health and Human Services, 1996).

### *Noncommunicable Diseases*

Diseases that are not transferable from person to person such as cardiovascular disease, type 2 diabetes, cancers, and obesity-related conditions. These diseases account for 60% of global deaths and almost half (47%) of the global burden of disease (World Health Organization, [WHO], 2004a)

### *Physical Activity*

Any bodily movement produced by skeletal muscles that result in energy expenditure (Caspersen et al., 1985; U.S. Department of Health and Human Services, 1996).

*Leisure-time physical activity.* Physical activity that is performed during exercise, recreation, or any additional time other than that associated with one's regular job duties, occupation, or transportation (U.S. Department of Health and Human Services, 1996).

*Moderate intensity physical activity.* This refers to physical activity requiring approximately 3 to 6 times as much energy as rest (Sallis & Owen, 1999) and can be equated to walking briskly at a rate of 3 to 4 miles per hour (U.S. Department of Health and Human Services, 1996). Other definitions of moderate physical activity include: (a) activity with a level of effort equivalent to a "perceived exertion" of 11 to 14 on the Borg scale (Borg, 1982); (b) activity with a level of effort corresponding to 3 to 6 metabolic equivalents (METs); (c) activity that burns 3.5 to 7 Calories per minute (kcal/min); or (d) the effort a healthy individual might expend while walking briskly, mowing the lawn, dancing, swimming, or bicycling on level terrain (U.S. Department of Health and Human Services, 1996). A person should feel some exertion but should be able to carry on a conversation comfortably during moderate intensity physical activity (U.S. Department of Health and Human Services, 1996).

*Vigorous intensity physical activity.* This level of activity requires approximately 7 times as much energy as rest (Sallis & Owen, 1999). Other definitions of strenuous physical activity include: (a) activity with a level of effort equivalent to a "perceived exertion" of 15 or greater on the Borg scale (Borg, 1982); (b) activity with a level of effort corresponding to 6 or more metabolic equivalents (METs); (c) activity that burns more than 7 kcal/ min; or (d) the effort a healthy individual might expend while jogging, mowing the lawn with a nonmotorized pushmower, chopping wood, participating in high-impact aerobic dancing, swimming continuous laps, or bicycling uphill (U.S. Department of Health and Human Services, 1996). Vigorous-intensity physical activity should be intense enough to represent a substantial challenge to an individual and results in a significant increase in heart and breathing rate (U.S. Department of Health and Human Services, 1996).

### *Physical Fitness*

A set of attributes (cardiorespiratory fitness, muscular strength, muscular endurance, flexibility, and body composition) that people have or achieve that relates to the ability to perform physical activity (Caspersen et al., 1985; U.S. Department of Health and Human Services, 1996).

### *Preferred Exercise Context*

*Exercise company.* Participation in solitary exercise or exercise with a partner, with a few people, or in a group (Courneya & Hellsten, 1998).

*Exercise location.* Participation in exercise at home, at a fitness club/community center, or outdoors (Courneya & Hellsten, 1998).

*Exercise structure.* Participation in organized versus unorganized, supervised/instructed versus unsupervised/self-paced, competitive versus recreational, and spontaneous/flexible versus scheduled exercise (CFLRI, 1996b; Courneya & Hellsten, 1998).

*Exercise type.* Participation in sports, aerobics, jogging, swimming, weight training, bicycling, skating, walking, or other exercise activities (Courneya & Hellsten, 1998).

### *Regular Physical Activity*

A pattern of physical activity is regular if activities are performed on most days of the week, preferably daily; 5 or more days of the week if moderate-intensity activities are chosen; or 3 or more days of the week if vigorous-intensity activities are chosen (U.S. Department of Health and Human Services, 1996).

### *Sedentary*

A sedentary lifestyle is a lifestyle characterized by little or no physical activity (U.S. Department of Health and Human Services, 1996).

### *Time Management*

Attempting to make more efficient and effective use of time through balance, flexibility and spontaneity in scheduling, and including the following behaviors and attitudes: Time analysis, planning, setting goals, prioritization, scheduling, organization, documentation, positive attitudes toward time, and time and organization preferences

(Barkas, 1984; Feény Jonson, 2002; Jorde, 1982; Lakein, 1973; Macan, 1990; Mackenzie, 1990; Morris, 2001; Soucie, 1986; Woolfolk & Woolfolk, 1986).

## Organization of the Dissertation

The dissertation is divided into seven chapters. The purpose of Chapter 2 is to provide a context for exercise-related time management by critically reviewing the physical activity and exercise literature pertaining to (a) health benefits of physical activity and exercise, (b) economic burden of inactivity, (c) recommendations for physical activity and exercise, (d) perceptions of the importance of physical activity, (e) physical activity, exercise, and sedentary rates, (f) problems with exercise adherence and the barriers to exercise, (g) the theoretical basis for the study of time management for exercise, and (h) and implications of lack of time as a barrier to exercise. The intention of Chapter 3 is to examine the existing time management literature and determine how this literature relates to time management for exercise participation and adherence. Chapter 3 includes a comprehensive review of existing time management literature, empirical time management research, and existing time management instruments. The procedures followed to develop and collect validity evidence for the TIMES are described in Chapter 4 including a description of the development and validation of the item pool, the expert panel methodology and results, and the small pilot study methodology and results. Chapter 5 describes the empirical validation methodology and results including descriptions of the data collection procedures, instrumentation, and field sample; results of the item and exploratory factor analyses; a reexamination of the expert panel judgments; an integration of the factor, item, and judgmental analysis results; and a description of the TIMES subscales. Chapter 6 consists of three sections describing the empirical validation methodology and results of the second draft of the TIMES including descriptions of the data collection procedures, instrumentation, and field sample; results of the item, confirmatory, and exploratory factor analyses; and a description of the subscales of the final draft of the TIMES. The purpose of Chapter 7 is to discuss the results of the TIMES, limitations of this study, the significance and impact of this research, and to suggest practical implications, future directions, and recommendations for the further validation of the TIMES.

# CHAPTER TWO

## Physical Activity and Exercise Literature Review

### *Introduction*

The purposes of this chapter are to critically examine the physical activity and exercise literature and to provide a context for the study of time management for physical activity and exercise. This chapter is subdivided into eight sections, each reviewing a specific aspect of physical activity and exercise. These sections include reviews of: (a) existing literature on the health benefits of physical activity and exercise; (b) economic burden of physical inactivity; (c) definitions of and recommendations for active living, physical activity, and exercise; (d) perceptions of Canadians as to the importance of physical activity; (e) physical activity, exercise, and sedentary rates; (f) problems with exercise adherence and the barriers to exercise, including lack of time for exercise; (g) theoretical basis for the study of time management for exercise participation and adherence; and (h) implications of lack of time as a barrier to exercise.

### *Physical Activity and Exercise in Context*

#### *World Stage*

On May 22, 2004, the World Health Organization's (WHO) *Global Strategy on Diet, Physical Activity, and Health* was endorsed by the Member States (including both Canada and the United States of America). In addition to strategies specific to nutrition, this strategy called for the Member States to: (a) develop, implement, and evaluate actions that promote individual and community health through physical activity; (b) promote lifestyles that include physical activity and foster energy balance; (c) reduce the prevalence of noncommunicable diseases and the risks related to physical inactivity; (d) define national physical activity guidelines; and (e) encourage and foster a favorable environment for exercise of individual responsibility for health through the adoption of lifestyles that include physical activity (WHO, 2004a).

### *Canadian Stage*

In February of 2003, federal and provincial/territorial Ministers responsible for physical activity set a national target to increase physical activity in each province and territory by ten percentage points by the year 2010 (Health Canada, 2004). In November of 2002, the Canadian Teachers' Federation, the Canadian Peadeatric Society and the College of Family Physicians of Canada issued a joint call to action urging parents, educators, politicians and policy makers to address the alarming increase in child and youth physical inactivity and officially endorsed the new Physical Activity Guidelines for Children and Youth developed by Health Canada and the Canadian Society for Exercise Physiology (LeBlanc, 2003). This call for action followed the Childhood Obesity release of the National Longitudinal Survey of Children and Youth which showed that children were even more likely to be obese than adults (Statistics Canada, 2002).

### *American Stage*

It is likely that much of the recent public policy surrounding physical activity was spurred by the United States. On July 16, 1996, the United States Surgeon General released an inaugural report on the responsibility of physical activity in preventing disease. Four critical roles of physical activity emerged from this report. First, research has demonstrated that significant health benefits and improved quality of life can be obtained by including a moderate amount of physical activity on most, if not all, days of the week. Second, research has established that greater amounts of physical activity, increased duration, or increased intensity of physical activity can result in greater health benefits. Third, research has revealed that physical activity reduces the risk of premature mortality in general and of developing or dying from coronary heart disease, hypertension, colon cancer, and non-insulin dependent diabetes in particular. Fourth, research has demonstrated that physical activity helps to reduce symptoms of anxiety and depression, is important for the development and maintenance of muscles, bones and joints, and can help to control weight (US Department of Health and Human Services, 1996). In concluding, the Surgeon General's report emphasized the importance of physical activity in disease prevention, and encouraged the American people to make physical activity a regular and sustainable part of their lives.

This report has since been followed up by more recent American calls for action to promote better health and prevent disease such as the signing of the WHO global strategy on diet, physical activity and health and the Healthier US Initiative which encourages all Americans to be physically active every day, eat a nutritious diet, obtain preventative health screenings, and make healthy choices (US Department of Health and Human Services, 2004).

## *Health Benefits of Physical Activity*

Researchers have long been aware of the beneficial effects of physical activity on health. Physical activity has been positively correlated with numerous physiological health benefits including a reduction in risk for all-cause mortality, osteoporosis, non-insulin dependent diabetes, and hypertension (Ainsworth, Montoye & Leon, 1994; Bo-abbas et al., 2002; Bouchard, Shephard, & Stephens, 1993; Colditz, 1999; Colditz et al., 1997; Knowler et al., 2002; Pronk et al., 1999). Physical activity has also been shown to prevent cardiovascular disease in adult men and women (Berlin & Colditz, 1990; Manson et al., 2002; Manson et al., 1999), to prevent obesity (Bouchard et al., 1993; Powell, Thompson, Caspersen & Kendrick, 1987), and to help with weight control (Centers for Disease Control and Prevention, 2004). In addition, physical activity improves the level of high density lipoprotein cholesterol and improves control of blood glucose in overweight people even without significant weight loss (Centers for Disease Control and Prevention, 2004). Physical activity can also help to prevent cancer of the colon, breast, prostate, lung, and endometrium (Friednreich, 2001; Pate et al., 1995; Pritchard et al., 2003; Rhind et al., 1994) and provides some protection against infectious diseases (Matthews et al., 2002; Rhind et al., 1994).

In addition to the physiological health benefits of exercise, there are many psychological benefits of exercise such as reduced state anxiety (Petruzello et al., 1991), decreased levels of depression (North et al., 1990; Taylor, Sallis & Needle, 1985), reduced negative stress (Crews & Landers, 1987), increased cognitive functioning (Thomas et al., 1994), improved self-esteem (McMahon, 1990; Sonstroem, 1988), enhanced self-concept (Stein & Mota, 1992), and a positive effect on life stress (Brown & Siegel, 1988).

Physical activity also has an indirect effect on health. For example, regular physical activity can reduce and even prevent age-related problems from occurring such as decreased $VO_2$ max, muscle mass, flexibility, cognitive functioning, perception of control, and self-efficacy (Mazzeo et al., 1998). Physical activity can also help older adults maintain the ability to live independently by helping to prevent falling and fractures (Centers for Disease Control and Prevention, 1996).

## *Economic Burden of Physical Inactivity*

### *Introduction*

There has been a dramatic increase in the incidence of noncommunicable diseases or chronic diseases such as cardiovascular disease, obesity, type 2 diabetes, some cancers, osteoporosis, and sarcopenia in the latter portion of the 20th century (Booth, Gordon, Carlson, & Hamilton, 2000). Current research in chronic disease tends to focus almost entirely on secondary or tertiary prevention of disease instead of on the primary causal factors. This is discouraging because the initial prevention of chronic disease produces less suffering and is much less expensive to society in terms of health care costs than the secondary prevention of overt disease (Booth et al., 2000).

Physical inactivity is one of the major underlying causes of unnecessary illness and premature mortality (Centers for Disease Control and Prevention, 1999; US Department of Health and Human Services, 1996) and produces at least seventeen unhealthy conditions at the cost of nearly one trillion dollars per year (Booth et al., 2000). The number of annual American deaths from physical inactivity alone is estimated to be approximately 250,000, which is equivalent to nearly one quarter of all preventable annual deaths (Booth et al., 2000). With respect to Canada, a 1981 study estimated that 32% of premature deaths in Canada were attributable to physical inactivity (Powell & Blair, 1994). Researchers have calculated that in 1999, 2.5% of total direct health costs in Canada amounting to 2.1 billion dollars and 21,000 premature deaths were attributable to physical inactivity (Katzmarzyk, Gledhill, & Shephard, 2000).

Worldwide, physical inactivity is estimated to cause 2 million deaths annually including 10 to 16% of the deaths due to breast cancer, colon cancer, or diabetes, and about 22% of the deaths due to ischaemic heart disease for both men and women (WHO, 2004b). Colditz (1999) estimated that 22% of CHD, 22% of colon cancers, 22% of osteoporotic hip fractures, 12% of diabetes, 12% of hypertension, and 5% of breast cancers in the United States are attributable to lack of physical activity. Using the upper bound of state level reports of no physical activity (48% of the population) the estimated cost of inactivity in the United States is $37.2 billion annually or 3.7% of direct health care costs. Further quantitative estimates indicate that sedentary living is the primary causal factor and is responsible for about one-third of deaths due to CHD, colon cancers, and type 2 diabetes (Powell & Blair, 1994). In Canada, a sedentary lifestyle is associated with a twofold increase in the risk of all cause mortality (Blair et al., 1989).

### *Obesity*

Globally, obesity has reached epidemic proportions. There are more than one billion overweight adults worldwide and at least 300 million of these adults are clinically obese (WHO, 2004c). Colditz (1999) noted that in cultures with abundant energy intake, lack of physical exercise contributes to the development of obesity or weight gain as a consequence of excess energy intake over energy expenditure. Recently, for the first time in history, the number of overweight people in the world was equivalent to the number of people who were underfed (CFLRI, 1999). However, obesity also exists in developing countries (WHO, 2004c). Obesity and overweight are causal factors in type 2 diabetes, hypertension, CHD, stroke, asthma, gallbladder disease, osteoarthritis, and cancer of the breast, colon, and endometrium (Booth et al., 2000; Colditz, 1999; Pronk et al., 1999; WHO, 2004c). Obesity is a complex condition, affecting virtually all ages and socioeconomic groups and is a major contributor to the global burden of chronic disease and disability (WHO, 2004c). Instead of relying on the treatment of secondary and tertiary clinical problems that result from being obese or overweight, a far greater emphasis on the primary prevention of obesity through increased physical activity is needed (Booth et al., 2000).

*Cardiovascular Disease*

In 2002, 29.2% of total global deaths resulted from various forms of cardiovascular disease (WHO, 2003). More than half of the deaths and disability from heart disease and strokes, which together kill more than twelve million people worldwide each year, can be reduced through changes to diet and levels of physical activity and smoking cessation (WHO, 2003).

Coronary heart disease is the leading cause of mortality in the United States. Each year in the United States, coronary heart disease is newly diagnosed in 1.5 million persons and accounts for an estimated 47 billion dollars in direct and indirect health care costs (Booth et al., 2000). Sedentary persons are known to have about twice the risk of developing heart disease as active persons (Powell & Blair, 1994). Mild to moderate physical activity can help prevent coronary heart disease (Centers for Disease Control and Prevention and Mortality Weekly Report, 1993). For each percentage point increase in the number of Canadians who become physically active there would be an associated reduction in annual treatment cost of coronary heart disease of 10.3 million dollars (CFLRI, 1999).

Moreover, according to a 1997 report by the Canadian Laboratory Centre for Disease Control (CLCDC), stroke accounts for 19% of all deaths due to cardiovascular disease in Canada (CLCDC, 1997). The prevention of cardiovascular disease is of public health importance because at least 20 million people worldwide survive heart attacks and strokes every year (WHO, 2003) and strokes are often accompanied by continuing costly clinical care and long-term functional limitations. Two primary causes of stroke are arteriosclerosis of brain blood vessels and high blood pressure, both of which can benefit from physical activity. Furthermore, exercise is mandatory following a heart attack or heart surgery to ensure safe rehabilitation and prevent deconditioning (Quaglietti & Froelicher, 1994).

Cardiovascular disease is no longer a disease of developed countries: Approximately 80% of all worldwide deaths due to cardiovascular disease took place in developing, low and middle-income countries. It is estimated that by 2010, cardiovascular disease will be the leading cause of death in developing countries (WHO, 2003). Heart disease appears to have no geographic, gender, or socio-economic boundaries (WHO, 2003).

### *Cancer*

Cancer is becoming an increasingly important factor in the global disease burden. Approximately 20 million people worldwide suffer from cancer and this figure is projected to rise to 30 million people worldwide within 20 years. The number of new cases annually is estimated to rise from 10 million worldwide to 15 million worldwide by 2020. Deaths due to cancer account for 7.1 million deaths annually which is equivalent to 12.5% of the global total deaths (WHO, 2003).

Yet with the existing knowledge, at least one-third of cancer cases that occur annually throughout the world could be prevented (WHO, 2003). While tobacco use is the single largest causative factor, dietary modification and regular physical activity are significant elements in cancer prevention and control (US Department of Health and Human Services, 1996; WHO, 2003). Depending upon the type of cancer, sedentary individuals have a 1.2 to 3.6 increased risk of developing cancer than those who are most active (US Department of Health and Human services, 1996). For example, exercise can help reduce the risk of colorectal cancer for both men and women (US Department of Health and Human services, 1996). In addition, exercise during adolescence may help to prevent breast cancer later in life (US Department of Health and Human Services, 1996). Studies have also consistently demonstrated that physical exercise has a positive effect on quality of life, including physical and functional well being, and psychological and emotional well being following cancer diagnosis (Courneya & Friedenreich, 1997).

Due to the protective effect of exercise on cancer, exercise may help to decrease the cost of treating individuals with cancer by reducing the number of individuals diagnosed with cancer. For example, in Canada, the annual treatment cost for colorectal cancer is 255 million dollars. For each percentage point increase in the number of people who are physically active, the treatment cost of colorectal cancer would decrease by 407 thousand dollars (CFLRI, 1999).

### *Older Persons*

By the year 2040 there will be approximately 8 to 13 million Americans over the age of 85 years. This is an alarming statistic because individuals over the age of 65 years carry the greatest proportion of the chronic disease, disability, and health care utilization burden (Campion, 1994). Much of this health care burden is preventable, especially through an active lifestyle (CFLRI, 1999). It is estimated that 50% of what is currently accepted as aging, such as decreases in lean body mass, increases in body fat, decreases in endurance, decreases in strength, and decreases in flexibility are due to a sedentary lifestyle (Drinkwater, 1985). Maintenance of an adequate activity level can prevent degeneration and functional losses of muscle and bone tissue (Schuster et al., 1995).

The potential impact of exercise on health care costs for post-retirement adults is considerable. The health care costs of those individuals over 65 years of age are three times those of younger individuals (Spiruduso, 1988). In the United States, the health care cost of individuals over the age of 65 is equivalent to three percent of the gross national product or $100 billion dollars (Spiruduso, 1988).

### *Children and Youth*

Childhood obesity in Canadian children increased by over 50% between 1981 and 1988 (Crawford & McCarger, 1994). In Canada, from 1981 to 1996, the prevalence of overweight increased by 92% in boys and 57% in girls. During the same period, the prevalence of obesity more than doubled for both boys and girls and the incidence of obesity in teens has doubled (Trembley & Willms, 2000). Obesity in children and youth is an important cause of childhood hypertension, as well as a risk factor for psychosocial, orthopedic, and respiratory disorders. If obesity is carried into adulthood, obesity is associated with higher risk of morbidity and mortality from chronic diseases in part due to the added risk of lipid abnormalities, elevated blood pressure, and non-insulin dependent diabetes. Studies have shown that excess body fat which develops in childhood tends to persist throughout childhood and into adulthood (CFLRI, 1999). Physical activity can affect obesity early in life. Encouraging life-long regular exercise in children may well have the greatest effect in terms of preventing obesity as well as numerous other benefits (Booth et al., 2000). It is crucial to foster the early development of an active lifestyle in children.

### *Overall Canadian Economic Burden*

According to a Canadian study by Pronk et al. (1999), increased physical activity is correlated to lower health care costs at the rate of 4.7% per active day per week. Even moderate activity three days per week would result in a nearly 15% reduction in health care costs for each active individual. Reducing the number of inactive Canadians by a further 10% would result in an additional savings of 5 billion dollars (CFLRI, 1999). Alternatively, a ten percent increase in the proportion of Canadians who are physically active could save 150 million dollars annually in health care costs for coronary heart disease, stroke, type 2 diabetes, colon cancer, breast cancer, and osteoperosis (Katzmarzyk et al., 2000). More specifically, a one percentage point increase in the number of Canadians who are physically active would result in annual treatment cost savings (in 1993 dollars) for ischemic heart disease (which accounts for 21.8% of Canadian deaths yearly) of $10,233,000, type 2 diabetes (2.4% deaths yearly) of $877,000, and colon cancer (2.2% deaths yearly) of $407,000 (The Conference Board of Canada, 1996).

### *Summary*

The prevention of chronic diseases through regular physical activity can improve individual quality of life and help control rapidly rising health care costs (CFLRI, 1998a). Physical activity is one of the easiest and most cost-effective ways to achieve the objective of having a physically and psychologically healthier population (CFLRI, 1999). Appropriately performed exercise has been called a "magic bullet" because of its ability to positively impact so many risk factors for chronic disease, prevent and delay the onset of these diseases, and enhance longevity and quality of life (Booth et al., 2000). The cost of health care is expensive - an ounce of prevention is worth a pound of cure (CFLRI, 1999).

### *Active Living, Physical Activity, and Exercise Recommendations*

Active living is defined as a way of life in which physical activity is valued and incorporated (CFLRI, 1997). The WHO (2004a) recommends that individuals engage in adequate levels of physical activity throughout their lives with different health outcomes requiring different types and amounts of physical activity. Although recommendations for physical activity and exercise differ according to the purpose and definition of the activity, studies have shown that to *maximize* health benefits, individuals should participate in physical activity or exercise every other day for at least thirty minutes at a moderate or greater intensity (CFLRI, 1996a).

Physical activity is defined as any bodily movement produced by skeletal muscle which results in energy expenditure (Centers for Disease Control and Prevention, 1997). Studies examining the adoption and maintenance of physical activity have been conceptualized and operationalized in different ways, such as increasing light and moderate intensity activities, increasing leisure time activities, or decreasing sedentary activities (Dunn, Anderson, & Jakicic, 1998). Generally, physical activity recommendations differ according to the intensity, duration, and frequency of the activity. For example, Canada's Physical Activity Handbook and Guide to Healthy Active Living (Health Canada and Canadian Society of Exercise Physiology, 1998) recommends accumulating 60 minutes of light physical activity (e.g., light walking, stretching, easy gardening) everyday. The total physical activity time can be reduced to 30 minutes 4 days per week as individuals progress to moderate activities (e.g., brisk walking, biking, swimming, water aerobics). Similarly, as individuals move towards vigorous activities (e.g., aerobics, jogging, hockey), total activity time can be reduced to 20 to 30 minutes, 4 days per week (Health Canada, 2004). As an overall rule, 30 minutes or more of moderate physical activity on most days of the week is recommended (Beaulieu, 1994). The WHO (2004a) supports this recommendation and adds that this level of regular physical activity reduces the risk of cardiovascular disease and diabetes, colon cancer, and breast cancer. Furthermore, muscle strength and balance training is also recommended to reduce falls and increase functional status in older adults and that more frequent activity for longer durations may be required for weight control (WHO, 2004a).

Conversely, exercise can be defined as a subset of physical activity that is planned, structured, and repetitive and which is purposively performed to improve or maintain physical fitness (Centers for Disease Control and Prevention, 1997). The American College of Sports Medicine has produced specific guidelines for healthy aerobic activity which state that individuals should exercise 3 to 5 days per week with a 5 to 10 minute warm-up, a 30 to 45 minute maintained intensity exercise session followed by a 5 to 10 minute cool down (American College of Sports Medicine, 2004).

Key recommendations for children's activity levels from Canada's Physical Activity Guides for Children and Youth (Health Canada, 2002a, 2002b) are to increase the amount of time Canadian children and youth spend being physically active by at least 30 minutes per day and decrease the amount of inactive time by 30 minutes per day (Andrew, 2002). More specifically, American guidelines recommend that children accumulate 30 to 60 minutes of moderate intensity activity on most days of the week (Council for Physical Education for Children, 1998).

The more physical activity or exercise an individual is able to do, the better, although any activity is better then none (Dunn et al., 1988). Even light participation in physical activity, which is too light for fitness gains, often will improve health and functional capacity (Mazzeo et al., 1998). For example, recent research has suggested that walking can reduce the risk of cardiovascular disease in postmenopausal women by about 12 to 40% over 3.2 years, to degrees similar to those achieved with vigorous physical activity. This is a significant finding as initiating a walking program may be easier and less intimidating than initiating a more vigorous exercise program (Manson et al., 2002).

In general, scientists recommend the accumulation of 30 minutes of physical activity on most, if not every day of the week to stay healthy or to improve health. The amount of physical activity should be summed over periods of at least 10 minutes (Health Canada and Canadian Society for Exercise Physiology, 1998) and may be performed purposively as exercise or performed throughout the day as physical activity.

### *Perceptions of Physical Activity as Important*

The vast majority of Canadians (90%) believe that physical activity is important to their overall health and many Canadians feel that physical activity is important to them personally (CFLRI, 1997). For example, 93% of Canadians report that physical activity is *very important*, *quite important*, or *somewhat important* to them personally. Furthermore, 33% of Canadians believe that physical activity plays an important role in their family life, 25% believe that physical activity is important to their social life, and 18% believe that physical activity is important to their sense of community life (CFLRI, 1997). There is a clear relationship between age and the perceived importance of physical activity to health as the percentage of Canadian adults rating physical activity as important to health declined across age groups. Although men and women appear to value physical activity equally, young men are more likely than young women to value physical activity, and women over the age of 45 years are more likely than men over the age of 45 years to value physical activity (CFLRI, 1997).

## *Physical Activity and Sedentary Rates*

### *Sedentary Rates Worldwide*

The prevalence of worldwide physical inactivity (sedentariness) among adults is estimated at 17% and the prevalence of worldwide insufficient activity (< 2.5 hours per week of moderate activity) is estimated to range from 31% to 51%, with a global average of 41%. At least 60% of the global population fails to achieve the minimum recommendation of 30 minutes of moderate intensity physical activity daily (WHO, 2004b).

### *Sedentary Rates in Canada*

Despite the abundance of documented evidence supporting the relationship between physical activity and health benefits and the overwhelming Canadian belief that physical activity is important, one in ten Canadians are completely sedentary (CFLRI, 1996a) and Canadian activity levels have stalled in recent years (CFLRI, 2000). The most recent estimates from the 1998/99 National Population Health Survey suggest that the majority of Canadians (55%) are physically inactive (CFLRI, 2001). Less conservative estimates indicate that nearly two-thirds of Canadians are physically inactive (Craig, Russell, Cameron, & Beaulieu, 1999).

According to the 2001 Physical Activity Monitor, results showed that 57% of adults aged 18 and older were considered insufficiently active for optimal health benefits (CFLRI, 2001). Moreover, the 1997 PAM showed that only 33% of Canadians aged 25 to 55 years met the recommended guidelines for daily activity, a further 29% did not meet the requirements for intensity or duration, 18% were active only 2 to 4 days per week, and 19% were active less then two days per week (CFLRI, 1997).

Overall, slightly more women (59%) than men (52%) are physically inactive (CFLRI, 2001). These results were corroborated by the 2000/01Canadian Community Health Survey where 54% women and 44% of men were found to be physically inactive (Coalition for Active Living, 2004). Gender related differences were most apparent among the 18 to 24 year age group where 60% of the women were insufficiently active as compared to only 36% of the men (CFLRI, 1999). A considerable difference was also found in adults over the age of 65 years, where 67% of women were inactive compared with 55% of men (CFLRI, 2001). Unfortunately, regardless of gender, as Canadians get older, their activity levels decrease.

Sedentary problems are also found with Canadian youth and children. Surveys have shown that three out of five children and youth aged 5 to 17 years are not active enough for optimal growth and development (CFLRI, 1998a). The term "active enough" was defined as energy expenditure of at least eight kilocalories per kilogram of body weight per day (CFLRI, 2002). Youth aged 13 to 17 years of age are less active than children aged 5 to 12 years of age with 33% of teens and 43% of grade school children considered sufficiently active (CFLRI, 2002).

There are also gender differences: Girls are significantly less active than boys; 64% of girls and 52% of boys are considered physically inactive (CFLRI, 2001). With respect to teens, only 40% of boys and 25% of girls are sufficiently active for optimal growth and development. The statistics improve slightly for grade school children: 48% of boys and 37% of grade school girls are considered sufficiently active (CFLRI, 1998a). According to the 1998/99 National Population Health Survey, 58% of Canadian youth aged 12 to 19 years were physically inactive in the three months prior to the survey and as many as 84% of Canadian youth may not have been active enough to meet international guidelines for optimal growth and development (CFLRI, 2001).

### *Continuum of Physical Activity in Canada*

The Transtheoretical Model (TTM) has been used to characterize the different phases of motivational readiness and has been applied to numerous health behaviors, including the adoption of physical activity (Marcus & Simkin, 1994; Prochaska & Marcus, 1994). A central concept in the TTM is the Stages of Change (SOC) (Prochaska, DiClemente, & Norcross, 1992). Through the use of the SOC, individuals can be classified into a specific stage along the readiness for physical activity continuum. The continuum consists of five stages: *Precontemplation* (PC) describes individuals who are not regularly physically active and who have no intention of becoming regularly physically active. *Contemplation* (C) describes individuals who are not regularly physically active but are thinking about becoming regularly physically active in the next 6 months. *Preparation* (P) describes individuals who are not regularly physically active but are planning on becoming regularly physically active within the next 30 days. *Action* (A) describes individuals who are regularly physically active for less than 12 months.

*Maintenance* (M) describes regularly physically active individuals who have been active for 12 months or more. *Relapse* (R) describes individuals who were physically active for 12 months or more but have since decreased their level of physical activity with no intention of returning to their previous level of physical activity.

Currently, approximately 39% of Canadians report that they have been active regularly over the previous 12 months (M). A further 36% have taken steps to become active and intend to be active in the next 12 months (A). However, 17% of Canadians are in relapse, having been active at some point in the previous 12 months, but not currently active nor intending to be so in the future. A further 5% are seriously contemplating taking some action to become more active, but are not active currently (C). Among the remaining 2% who are not active, most are in precontemplation having not been active in the past 12 months and not intending to be active in the future, with very few having dropped out of activity with no intention to resume (CFLRI, 2001).

Although the level of physical activity among Canadians has increased between the late 1990's and 2001, as of the year 2000, 64% of Canadians were still not active enough to benefit their health (CFLRI, 2000). This percentage has remained virtually unchanged since 1995. The majority of Canadians still face increased risk of chronic disease and premature death due to physically inactive lifestyles. There is a growing concern among health professionals, researchers and public policy experts that as the Canadian society ages, the current level of physical inactivity will hamper the quality of life for the majority of Canadians. In addition, the high levels of inactivity have the potential to negatively affect the ability of the majority of Canadians to maintain their independence thereby placing increased demands on the health care system (CFLRI, 1999).

Additional research has shown that the Canadian population is not alone in their sedentary habits. Stephens and Caspersen (1994) found that only 10% of the Canadian, Australian, English and American populations engaged in aerobic activities. *Aerobic activities* was defined as engaging in vigorous activities during leisure time for a minimum of twenty minutes, three times per week at a minimum intensity of seven METs (Stephens & Caspersen, 1994).

*United States*

American epidemiological studies show that only 15% of the American population is vigorously active at the levels prescribed by the American College of Sports Medicine (Dunn et al., 1998). Similarly, 60% of Americans are inadequately active, and 24% are completely inactive (US Department of Health and Human Services, 1996). The prevalence of leisure-time physical activity among the US population was assessed in 1994. Results showed that approximately 25% of American adults were physically inactive, 22% reported light to moderate physical activity, and only 15% reported vigorous physical activity sufficient to improve cardiovascular fitness (Centers for Disease Control and Prevention, 1994; National Center for Health Statistics, 1991, 1994). Overall, it has been estimated that 53 million Americans are inactive in their leisure time (Centers for Disease Control and Prevention, 1997).

National and regional surveys reveal that 70% or more of older American adults do not engage in regular exercise (Clark, 1995). General population estimates indicate that 30% to 60% of American post-retirement adults engage in no leisure-time physical activity, and only 10% of post-retirement adult Americans engage in regular vigorous physical activity (Dishman, 1990). Female post-retirement adults were particularly sedentary (Schuster, Wright & Tomich, 1995). American national leisure-time physical activity participation rates are consistently low for women, older adults, persons with low education, and racial and ethnic minorities (Piani & Schoenborn, 1990).

### *Comparisons Between the US and Canada*

According to the 1994 Behavioral Risk Factor Surveillance System, more then 60% of American adults were not regularly physically active either at a recreational level or five days a week for twenty minutes. Using a similar definition for the year 1994, 53% of Canadians were not active. With respect to total inactivity, 25% of Americans were not active at all while 10% of Canadians were not active at all (US Department of Health and Human Services, 1996).

## *Exercise Adherence and Perceived Barriers to Exercise*

In addition to the low exercise participation rates there are extensive problems with exercise adherence. Approximately 50% of the individuals who initiate a structured exercise program drop out within the first six months (Dishman, 1988). Exercise adherence problems have been found for children, university students, the middle aged, and the elderly. In addition, the adherence problem has also been identified in primary prevention, secondary prevention, and work-site settings (Robinson & Rodgers, 1994).

It is necessary to understand exercise behavior in order to produce realistic intervention strategies aimed at encouraging exercise behaviors and thus improving physical and psychological health. The process of distinguishing both the determinants and the barriers to exercise behavior has been the central theme for many studies

(Dishman, 1988; Dishman et al., 1985; Martin & Dubbert, 1982). Once the determinants and the barriers of exercise have been identified, prediction and explanation of exercise behaviors may be feasible (Dishman & Sallis, 1994).

In western countries, one of the strongest correlates of exercise is the perceived environmental barriers an individual has to exercise (Lian et al., 1999). According to Dishman (1994), perceived barriers may exert a negative influence as strong or stronger than true barriers on physical activity because physical activity is under the volitional control of each individual. When questioned, individuals provide numerous reasons as to why they do not participate in or adhere to exercise programs. Common barriers to exercise cited by both adult and youth populations are inadequate facilities (CFLRI, 1996; Fitness Canada, 1983), the physically demanding nature of exercise, existing medical problems (Godin, Shephard, & Colantonio, 1986), lack of social support, laziness, family obligations, and lack of interest (Harris, 1984; Tappe et al., 1989). However, the predominant reason given by individuals in an attempt to explain their inactive lifestyles or their reasons for dropping out of exercise programs is lack of time (Dishman, 1990) or time pressure (Dishman et al., 1985).

## *Theoretical Basis for the Study of Time Management*

Lack of time as a barrier to exercise can be studied from the perspective of the theory of planned behavior (TPB). The TPB is a theory that was originally developed to predict intention and behavior (Ajzen, 1991). The TPB states that an individual's intention to perform a behavior is the principal determinant of the behavior (Ajzen, 1991). An individual's intention is, in turn, dependent upon an individual's attitude, subjective norm, and perceived behavioral control. The TPB states that individuals will intend to carry out a behavior when they think positively about the behavior, when they believe that their significant others think they should carry out the behavior, and when the individuals themselves perceive the behavior to be under their control (Ajzen, 1988). In situations where the individual does not have complete control over the behavior, the individual's perceptions of control may be the most significant predictor of his or her behavior (Ajzen, 1991). Thus, discrepant findings such as the inconsistencies between the values and beliefs Canadians possess towards physical activity and their subsequent rates of physical activity participation and adherence can be studied from the perspective of the TPB.

One component of the TPB framework that has received much attention in the exercise psychology literature is perceived behavioral control. Within the framework of physical activity, perceived behavioral control can be characterized as an individual's perceived barriers to physical activity (Dishman, 1988; Dishman et al., 1985). According to Dishman (1994), perceived barriers may exert a negative influence as strong or stronger then true barriers to physical activity because physical activity is under the volitional control of each individual. Thus, identification of the significant barriers to physical activity and exercise are necessary in order to predict and explain exercise behavior for a specific population (Dishman, 1994).

### *Lack of Time for Exercise*

Lack of time is the principal and most prevalent self-reported reason that North American adults give as to why they drop-out of supervised clinical and community exercise programs (Dishman, 1982, 1990, 1991; Dishman et al., 1985; Martin & Dubbert, 1982; Oldridge, 1982) and for inactive lifestyles (CFLRI, 1996; Dishman, 1991; Dishman et al., 1985; Gallup Organization, 1985; General Mills, 1979; Harris, 1984; Slenker, Price, Roberts, & Jurs, 1984). In the physical activity determinants literature between 1988 and 1999, lack of time has consistently been documented as having a negative association with physical activity for both the general population and for supervised setting samples (Dishman & Sallis, 1994). For example, in a cross-sectional study of the United States, 1,019 representative adults were interviewed and reported that their major reason for not exercising was *no time or too busy* (Gallup Organization, 1985). In a similar American survey, respondents indicated that the three major reasons for not getting enough exercise were *not enough time*, *health reasons* and *family obligations* (Harris, 1984). Moreover, the Perrier study found that the greatest reported barriers to exercise for Americans were not enough time and health reasons (Harris, 1984). Research has shown that sedentary people who intended to exercise, but did not, found exercise to be too physically demanding and required too much time away from their weekly routine (Harris, 1984). Similar findings have also been shown internationally. The results of a 1990 study of Australian households showed that 73.9% of respondents found not enough free time to be *sometimes* or *often* a barrier to exercise (Jones-Roberts & Shilton, 1990).

With respect to Canada, the respondents of the 1983 Canada Fitness Survey indicated that *no time due to work pressures*, *too lazy or lack of energy*, and *inadequate facilities* were the three major perceived barriers to exercise (Canada Fitness Survey, 1983). The most recent Canadian survey of barriers to physical activity, conducted by the CFLRI in 1995, found three major barriers (CFLRI, 1996b). These three barriers were identified as *lack of time*, *lack of energy* and *lack of motivation*. The three major barriers to exercise identified by Canadians in 1983 are essentially the same three barriers identified by the Canadian population twelve years later, in 1995. Furthermore, a 2001 survey of workplace barriers to physical activity found that two in five Canadians believe that lack of time due to work is an important barrier to their physical activity (CFLRI, 2001).

According to the 1995 Physical Activity Monitor (CFLRI, 1996b), lack of time was described by Canadians from the ages of 18 to 64 years as the number one barrier to physical activity. Moreover, lack of time as a barrier to physical activity did not differ across gender; both male and female Canadians between the ages of 18 and 64 years identified lack of time as the most significant barrier to physical activity.

However, an American study found that lack of time as a barrier to exercise for females differed significantly by race and by income. Women who were classified as *middle income* were more likely to report lack of time as a barrier to leisure-time physical activity than *lower income* women. Moreover, Caucasian women were more likely to report lack of time as a barrier to leisure time physical activity than African American women (Hall, 1998).

The age group comprising individuals 65 years of age or older was the only age group that did not identify lack of time as the number one barrier to physical activity in the 1995 Canadian study. However, this population group still identified lack of time as the sixth most serious barrier. Additional research supports the idea that the older population does find lack of time to be a barrier to exercise. For example, in a study of older women, lack of time was identified as both a perceived barrier and an actual barrier to participating in a walking program (Ready, 1996). Furthermore, a Singapore study

(Lian et al., 1999) of 2,494 individuals, 60 years of age and older, found that lack of time for exercise and poor health were most strongly correlated with being sedentary.

Lack of time as a perceived barrier to exercise or being *too busy* to exercise has also been found with children, adolescent, and youth populations (Centers for Disease Control and Prevention, 1997). Time constraints have been reported as a significant barrier to the recruitment of at-risk children into structured exercise programs (Rowland, 1986) and as a major barrier to exercise for high school students (Tappe et al., 1989). For example, Tappe et al. (1989) examined the perceived barriers toward exercise among 236 high school aged males and females. Results indicated that adolescents who reported low levels of physical activity perceived time constraints as a greater barrier to exercise than highly active adolescents. In addition, a gender difference in perceived barriers to exercise existed among the adolescents. Females reported *wanting to do other things with my time* as the most relevant barrier to exercise (Tappe et al., 1989). One study of adolescent leisure-time use reported that boys were more physically active and spent more time in sports than girls (Shaw et al., 1995). Lack of time for physical activity has also been identified by children. Perceived barriers to physical activity for children have been identified as competitive stress, parental pressure to excel, lack of fun, lack of play time, limited opportunity for improvement, and not liking the coach (CFLRI, 1999).

However, it is not just healthy populations that have identified lack of time as a barrier to exercise. Even cancer patients undergoing treatment who were trying to maintain an exercise program identified *no time for exercise* as the most relevant control belief associated with perceived barriers to exercise (Courneya & Friedenreich, 1997). Regardless of population, the studies examining the perceived barriers to exercise reveal a similar trend. Lack of time for physical activity or exercise is a significant perceived barrier, if not the most significant perceived barrier for North Americans. Due to the abundance of research showing lack of time as a perceived barrier to exercise, lack of time has been recognized as the number one barrier to exercise in Canada and the United States for both adult and youth populations.

### *Implications of Lack of Time as a Barrier to Exercise*

Perceived lack of time for exercise and the potential disruption in daily routines caused by exercise may interfere with actual exercise participation (Dishman et al., 1985). Time problems may also exist because different activities require different amounts of commitment to maintain participation. For example, the time commitment required for an individual to plan 30 minutes for a run after supper is probably less than that needed to join a fitness club and make the necessary preparations to run the treadmill for thirty minutes several times per week (Dishman et al., 1985).

Perceived environmental barriers such as time have the ability to outweigh an individual's personal intention to exercise. Therefore, due to the correlation between time as a perceived barrier and exercise behavior, perceived barriers should receive attention in the planning of physical activity programs (Steinhardt & Dishman, 1989). Time management problems may require vigilant behavioral planning on the part of the exerciser. In addition, behavioral and cognitive-behavioral strategies developed to mitigate time management problems may be beneficial adjuncts to existing exercise programs and may help to increase exercise participation and exercise adherence (Dishman et al., 1985).

These results indicate the need for a training program in exercise related time management strategies for adolescents and adult populations regardless of health status (Tappe et al., 1989). A greater involvement in physical activity may be likely if people are given the opportunity, necessary motivation and direction as to how to incorporate exercise into their daily or weekly routine (Jones-Roberts & Shilton, 1990). Research shows that interventions which provide support, such as flexible scheduling for regular exercise, are important elements that are needed to increase participation and adherence in exercise programs (Johnson, Corrigon, Dubbart, & Gramling, 1990). Individuals are more likely to become and remain physically active if they engage in activities that they feel competent doing, find enjoyable, can easily access, and fit into their daily schedules.

In order to address the issue of what types of supports would best aid Canadians in helping to become physically active, the 1997 PAM surveyed Canadians on this issue. Assistance in planning a daily schedule to include physical activity was equally important for men and women and was chosen by 18% of the respondents as very important following other support options such as safe access to streets, affordable facilities, and access to paths (CFLRI, 1997). Studies show that people are more likely to become and remain active if they perceive that the benefits of participation outweigh the costs including time, effort, energy, and dollars (CFLRI, 1997).

## *Conclusions*

Research has clearly documented the physiological and psychological health benefits associated with physical activity, established the underlying influence of physical inactivity on secondary illness and premature mortality, and documented the reduction in health care costs that would occur if Canadians increased their physical activity.

Although the majority of Canadians believe physical activity is important to their health, many Canadians of all ages are not physically active at the recommended levels. Furthermore, for both adults and adolescents, the most significant perceived barrier to physical activity and exercise is lack of time. Despite this, time management for exercise participation and adherence has received little attention. Indeed, there are no published exercise-related time management instruments and no published intervention studies using time management to increase the participation and adherence of individuals to exercise.

# CHAPTER THREE

## Time Management Literature Review

### *Introduction*

The purpose of the present chapter is to examine the existing time management literature and to determine how this literature relates to time management for exercise participation and adherence. More specifically, the purpose of this chapter is threefold: (a) to describe the current state of time management; (b) to comprehensively review existing published and peer-reviewed literature relating to the concept of time management in order to delineate the skills and behaviors associated with time management; and (c) to identify and critically examine existing instruments assessing time management. Based on the literature, a rationale for the development of an instrument assessing time management for exercise is established.

The chapter consists of three sections. The first section is a review of the current state of time management and the rationale for time management training including the populations for whom recent time management literature is written. The second section is a review of the time management skills and behaviors identified in the education, industrial, administrative, management, coaching, and sport and exercise psychology domains. The third and final section is a review of time management instruments consisting of a review of commercially available time management instruments and a review and critique of existing research-based time management instruments.

### *Review of the Current State of Time Management*

Time management is a misnomer (Jorde, 1982). Time itself cannot be managed or controlled (Drawbaugh, 1984). Time is just a unit of measurement (Anderson, 1984) with no inherent meaning (Jorde, 1982). It is an abstract and theoretical concept (Drawbaugh, 1984) and humans must attribute meaning to time (Anderson, 1984). People do not have a lack of time but rather a problem with what they do with time (Jorde, 1982). People must manage themselves to utilize time more efficiently and effectively (Morris, 2001).

The use of time as a resource should be analyzed, planned, and structured (Knight, 1989). Otherwise poor time management can cause problems in all aspects of life including missed deadlines, unfinished projects, disappointed employers, cancelled appointments, and annoyed friends. Mismanagement of time can also lead to low self-esteem, depression, unfulfilled career aspirations, and self-destructive habits such as inactivity (Barkas, 1984).

Time management techniques have long been recognized as a means to improve performance, reduce tension, and increase satisfaction (Lakein, 1973; Macan, 1994, 1996; Macan et al., 1990). However, individuals appear to differ in their preferences for routine, structure, and future orientation and the extent to which they prefer to focus on goals or on planfulness (Smith, 1999). Time is also a western cultural concept (Barkas, 1984; Hall, 1983; Zerubavel, 1981) with different cultural groups having different temporal emphases (Smith, 1999). There appears to be age differences in planning strategies (Smith, 1999) and gender differences in perceptions of time and leisure time (Lenskyj, 1988).

There are also personality differences associated with time. For example, the typical *Type A* individual tends to feel chronic time pressure that is in turn linked with both physiological and interpersonal problems (Mudrack, 1999). However, research has shown that persons whose time is structured and purposive appear not to possess the toxic aspects of Type A behavior (Mudrack, 1999). In terms of time management, research has demonstrated that people who have a preference for judging and sensing (as assessed by the MBTI) scored higher on measures of time management than other personality types (Williams et al., 1995). This research suggests that various personality types would likely have different requirements for a time management intervention (Williams et al., 1995).

Individuals are often unaware of their particular time personalities (Bluedorn, Kaufman, & Lane, 1992). Two of the fundamental differences among people are their overall temporal orientations and their differing abilities to deal with the future (Bluedorn & Denhardt, 1988). Individuals also differ in their temporal orientations to activity (Bluedorn & Denhardt, 1988). There are degrees of polychronicity (Bluedorn et al., 1992). Monochronic time is a preference for doing one task at a time while polychronic time refers to a preference for doing two or more things simultaneously (Bluedorn & Denhardt, 1988; Bluedorn et al., 1992). Most of the time management techniques seem to imply that the monochronic time orientation is superior to the polychronic orientation (Bluedorn & Denhardt, 1988). However, there is minimal comparative research between monochronic and polychronic orientations (Bluedorn & Denhardt, 1988).

The past 20 years have demonstrated an epidemic of time management training (Quirk, 1989). For example, 1989 *Training Magazine's Industry Report* estimated that almost two-thirds of U.S. organizations with more than 100 employees provided time management training (Quirk, 1989). Macan (1994) noted that, "…because the books, articles, and seminars on time management, along with their assertions, prescriptions and anecdotes, continue to proliferate, it is necessary to examine time management critically" (p.383).

Industry and big business are not the only organizations to examine time management and time management training. There is a large body of literature examining time in the education domain, specifically in reference to time and schools (e.g., Knight, 1989), time and school learning (e.g., Anderson, 1984; Bloom, 1965; Carroll, 1963), time management and study skills for students (e.g., Carney, 1988; Crutsinger, 1994; Danyluk, 1985; Gibbs, 1993), and time management for educators (e.g., Collins, 1987; Feeney Jonson, 2002; Jorde, 1982; Kozoll, 1982; Morris, 2001; Wachter & Carhart, 2003). In a recent study of the support services provided for student-athletes, it was found that time management courses were provided by 79% of the colleges surveyed (Keim & Strickland, 2004).

Some of the populations recently identified as needing time management training programs include adults performing job searches (Lindgren, 2004), general and at risk for drop-out university students (Zinatelli et al., 2002), online students (Bocchi et al., 2004), adults and college students with diabetes (Wdowik et al., 2001), and student athletes (Keim & Strickland, 2004). Recent time management training programs are also taking advantage of technology for their delivery. One recent study used computer-based training to teach students time management in a relatively standardized and cost effective manner (Zinatelli et al., 2002).

Many people feel that they do not have the time to exercise. This is compounded by the fact that many people feel that vigorous exercise for long periods each day is their only alternative (CFLRI, 1999). Some of the key components of successful exercise programs include individualized goal setting, signing program contracts, bimonthly training calendars, records of exercise sessions, simple incentives, and rewards to self

(CFLRI, 1997). Many of those key components of successful exercise programs are also components of time management training.

## *Review of Time Management Skills and Behaviors*

### *Introduction*

A literature review of the time management skills and behaviors identified in the education, industrial, administrative, management, coaching, and sport and exercise psychology domains was conducted. Sources of the review included CD-ROM searches, cross-referencing of journal articles, and hand searches of relevant journals. The references for each article found during the database search were reviewed for additional articles, that by their title, use within the article, or by referencing appeared to be related to time management for exercise. The search focused on literature published in the English language prior to July 2004. Keywords used in the search included time, time management, time management skills, time management behaviors, time management training programs, time and exercise, planning, and organizing. The search located several empirical papers as well as generic and popular books and articles on time management.

Time management has been described in many different fashions including spontaneity, balance, flexibility, and having control over time (Lakein, 1973). Time management has also been characterized as a habit developed only through determination and practice (Simpson, 1978), as prioritizing and respecting those priorities (Soucie, 1986), and as setting priorities and scheduling tasks (Jordan et al., 1989). Time management can also be considered as the process by which an individual more effectively accomplishes tasks and goals (Schuler, 1979), a process by which an individual obtains control over the timing and the content of what he/she does (Oncken Jr. & Wass, 1985), and lastly as what can be accomplished with time (Mackenzie, 1972, 1975, 1990).

In order to utilize time effectively individuals must first be able to predict how much time is needed for the activity (Kelly, 2002). An individual will become effective in using their time only when the individual clearly knows what they want to do, what they need to do, and for which specific target date (Soucie, 1986). Individuals need to become more disciplined in their use of time by respecting their established priorities while minimizing distractions from others as well as from situations that have the ability to displace priorities in terms of time and energy (Soucie, 1986).

According to Crutsinger (1994), time management involves determining what one should do by setting goals, deciding which events are the most important and realizing that other activities will have to be scheduled around them (prioritizing), making decisions about how much time to allow for certain tasks (time estimation), adjusting to the unexpected (problem solving), reconsidering goals and priorities on a regular basis (evaluation), and observing patterns and trends in behavior.

There is debate over exactly what skills and behaviors constitute effective time management. For example, Shipman et al. (1983) identified six principles for effective time management. These principles included being aware of self, structuring time appropriately, setting goals and priorities, increasing personal efficiency and effectiveness, scheduling time for activity, and scheduling relaxation time. Time management behaviors have more recently been characterized as making lists, organizing, goal setting, keeping and routinely evaluating one's schedule, and breaking down tasks into simpler parts (Kelly, 2002).

Empirical research investigating the effects of time management behavior has identified three broad clusters of behaviors. These behaviors include setting goals and priorities, engaging in the mechanics of time management, and having a preference for organization (Adams & Jex, 1999; Macan, 1994, 1996; Macan et al., 1990). However, seven time management skills or behaviors can be considered essential to effective time management due to their repetitive prominence in the literature: (a) time analysis, (b) planning, (c) goal setting, (d) prioritizing, (e) scheduling, (f) organizing, and (g) establishing new and improved time habits (Barkas, 1984; Feeny Jonson, 2002; Jorde, 1982; Lakein, 1973; Mackenzie, 1972, 1975, 1990; Morris, 2001; Woolfolk & Woolfolk, 1986). Although, time management documentation activities such as making lists, writing down goals, and utilizing calendars have been identified by many authors as necessary for effective time management, they tend to cross all seven skill areas. Table 1 provides a summary of the characteristics of time management behaviors and skills as identified by empirical research and popular books, articles, and multimedia on time management.

Table 1

*Time Management Characteristics Identified by Empirical Research and Popular Literature*

| Author | A | PL | GS | P | S | O | D | GH |
|---|---|---|---|---|---|---|---|---|
| Adams & Jex, 1999 |  | √ | √ | √ |  | √ | √ | √ |
| Ashkenas & Schaeffer, 1985 | √ | √ | √ | √ |  |  | √ | √ |
| Atkinson, 2001 |  | √ |  |  |  | √ |  | √ |
| **Barkas, 1984** | √ | √ | √ | √ | √ | √ | √ | √ |
| Blanchard & Johnson, 1981 |  |  | √ |  |  |  |  |  |
| Bliss, 1976 |  | √ | √ | √ | √ |  | √ |  |
| Bond & Feather, 1988 |  | √ |  |  |  |  |  |  |
| Braunstein, 1999 |  |  | √ |  |  |  | √ | √ |
| Britton & Tesser, 1991 |  |  | √ | √ | √ |  | √ |  |
| Buck, 2003 |  | √ |  |  | √ | √ | √ | √ |
| Burka & Yuen, 1983 |  |  | √ |  | √ |  | √ |  |
| Burt & Kemp, 1994 |  | √ | √ | √ |  | √ | √ | √ |
| Calabresi & Cohen, 1968 | √ | √ |  |  | √ | √ |  | √ |
| Carney, 1982 |  |  | √ | √ |  |  | √ | √ |
| Collins, 1987 |  | √ | √ | √ | √ |  | √ | √ |
| Corwin et al., 2001 |  | √ |  | √ | √ | √ |  |  |
| Crutsinger, 1994 | √ | √ | √ | √ |  |  | √ | √ |
| Cuismano, 1999 |  |  | √ | √ | √ | √ |  |  |
| Danyluk, 1985 | √ | √ |  | √ | √ | √ | √ | √ |
| Delahoussaye, 2002 |  |  |  | √ |  |  | √ |  |
| Drawbaugh, 1984 | √ | √ | √ |  | √ |  | √ | √ |
| **Feeny Jonson, 2002** | √ | √ | √ | √ | √ | √ | √ | √ |
| Foust, 2000 | √ | √ | √ | √ | √ |  | √ | √ |
| Francis-Smythe & Robertson, 1999 |  | √ | √ | √ |  | √ | √ | √ |
| Gafarian et al., 1999 | √ | √ |  | √ | √ | √ | √ | √ |
| Geist, 2003 |  | √ | √ | √ |  | √ |  | √ |
| Gerdes, 2001 |  |  |  |  |  | √ | √ |  |
| Gibbs, 1993 |  | √ | √ |  | √ |  | √ | √ |
| Gutfeld & Rao, 1994 |  |  |  |  |  | √ |  | √ |
| Hessing, 1994 |  | √ |  | √ | √ | √ |  |  |
| Hoch, 2000 |  |  |  |  | √ | √ | √ | √ |
| Jordan et al., 1989 |  | √ | √ | √ | √ |  |  | √ |
| **Jorde, 1982** | √ | √ | √ | √ | √ | √ | √ | √ |
| Kaehler, 2000 |  | √ |  |  |  |  |  | √ |
| Kelly, 2002 | √ |  |  |  |  |  |  | √ |
| Knight, 1989 | √ | √ |  | √ |  |  |  | √ |
| Kotter, 1982 |  | √ | √ |  | √ |  | √ |  |
| Kozoll, 1982 | √ | √ |  | √ |  | √ |  | √ |
| Lahmers & Zulauf, 2000 |  | √ | √ | √ |  | √ | √ | √ |
| **Lakein, 1973** | √ | √ | √ | √ | √ | √ | √ | √ |
| Landy et al., 1991 | √ | √ |  |  | √ | √ | √ | √ |
| Lang et al., 1990 |  |  |  |  | √ |  |  |  |

Table 1 continued

*Time Management Characteristics Identified by Empirical Research and Popular Literature*

| Author | A | PL | GS | P | S | O | D | GH |
|---|---|---|---|---|---|---|---|---|
| Lindgren, 2004 | | √ | √ | | | | | |
| Macan, 1994; 1996 | | √ | √ | √ | | √ | √ | √ |
| Macan et al., 1990 | | √ | √ | √ | | √ | √ | √ |
| Mackenzie, 1972; 1975; 1990 | √ | √ | √ | √ | √ | | √ | √ |
| McGrath & Rotchford, 1983 | | | | | √ | | √ | |
| **Morris, 2001** | √ | √ | √ | √ | √ | √ | √ | √ |
| Napier & Goldstein, 1997 | | | √ | | √ | | √ | √ |
| Orpen, 1993 | | √ | √ | √ | | √ | √ | |
| Osbourne, 1995 | | | | | | | | √ |
| Perry, 1997 | | | √ | √ | | | | |
| Puffer, 1989 | | √ | √ | | √ | | √ | √ |
| Quirk, 1989 | | √ | | √ | √ | | | √ |
| Rice, 1984 | | √ | | √ | √ | | √ | |
| Schriber & Gutek, 1987 | √ | | | √ | √ | √ | √ | |
| Schuler, 1979 | √ | | √ | √ | | | | √ |
| Shahani, Weiner, & Streit, 1993 | | √ | √ | √ | | √ | √ | √ |
| Shipman et al., 1983 | √ | | √ | √ | √ | | √ | |
| Simons & Galotti, 1992 | | √ | √ | √ | √ | | | |
| Simpson, 1978 | √ | | | √ | | | | |
| Smith, 2002 | √ | √ | √ | √ | √ | √ | | |
| Smith, 1999 | √ | √ | √ | | √ | | | √ |
| Soucie, 1986 | √ | | √ | √ | √ | | √ | √ |
| Stevens & Pfost, 1984 | √ | √ | | √ | | | | √ |
| Taylor & Mackenzie, 1986 | | | | √ | √ | √ | √ | √ |
| Topper, 2003 | | | √ | | √ | | √ | √ |
| Trockel et al., 2000 | | | | | | | √ | |
| Wachter & Carhart, 2003 | | √ | | | | √ | | √ |
| Weber & Vogel, 1977 | | | √ | √ | √ | √ | | |
| Wessman, 1973 | | √ | | | √ | √ | | |
| White, 2001 | | | | √ | | | | |
| Williams et al., 1995 | | | √ | √ | √ | | √ | |
| Winter et al., 1993 | | √ | | √ | √ | | | |
| **Woolfolk & Woolfolk, 1986** | √ | √ | √ | √ | √ | √ | √ | √ |
| Yoels & Claire, 1994 | | | | | √ | √ | | |
| Zinatelli et al., 2002 | √ | | √ | √ | | | √ | |
| **% of Articles Indicating Each Time Management Characteristic** | **35.9** | **62.3** | **58.4** | **63.6** | **57.1** | **45.5** | **59.7** | **61.0** |

*Note.* A refers to time analysis, time awareness, and time estimation. PL refers to planning. GS refers to setting goals. P refers to setting priorities. S refers to scheduling. O refers to organization including use of routines. D refers to use of time management documentation. GH refers to the establishment of good time management habits such as avoiding procrastination, delegation, and creating balance. √ indicates the time management characteristic was stated by the author. Bolded authors discussed all eight time management characteristics.

### *Time Analysis*

Effective time management involves analyzing behaviors for any specific occurrences of inefficient time management (Barkas, 1984; Morris, 2001; Soucie, 1986; Stevens & Pfost, 1984). Awareness of current time management behaviors is important (Soucie, 1986) because an individual must know where and how time is utilized in order to control time (Mackenzie, 1972, 1990). Time audits, with the aid of a time log, should regularly be conducted in order to discover where time is being spent (Schuler, 1979; Simpson, 1978; Soucie, 1986; Stevens & Pfost, 1984). A time log can be characterized as a systematic method of recording actual time use at regular intervals throughout the day (Simpson, 1978). A written time log is essential since memory can be deceiving with individuals often forgetting the minor or mundane events of the day (Shipman et al., 1983; Simpson, 1978).

A time log should take no longer than a total of five minutes throughout the day to complete (Mackenzie, 1990; Simpson, 1978). However, the length that time logs should be kept is questionable. For example, Mackenzie and Bliss suggest that time logs should be kept for at least three days (Bliss, 1976; Mackenzie, 1990) while Simpson suggests that time logs should be kept upwards of a two to three week period (Simpson, 1978).

Once the time log has been completed, it needs to be examined for unwanted *time wasters* (Mackenzie, 1972, 1975, 1990; Simpson, 1978) or *time thieves* (Schuler, 1979) in order to eliminate such activities from the schedule. Common time thieves involve activities such as jobs that contribute little or nothing, tasks that can be delegated, involvement in meetings, red tape, and paperwork (Collins, 1987; Schuler, 1979; Simpson, 1978). In addition, unexpected interruptions such as telephone calls, drop-in visitors, underestimating time commitments and task requirements (Stevens & Pfost, 1984), ineffective delegation, the inability to say *no*, complaining, procrastination (Morris, 2001), lack of self-discipline, socializing, and poor communication (Taylor & Mackenzie, 1986) can also rob time. Being disorganized, lacking objectives, priorities or planning, or shifting priorities will also contribute to the amount of time that is wasted. Other time thieves include commuting and travel time (Barkas, 1984), excessive family demands (Shipman et al., 1983), fear of failure or success, perfectionism (Barkas, 1984) and worry (Morris, 2001). Blocks of free time can be created by attempting to limit or eliminate these behaviors. (Simpson, 1978).

The greatest benefits of a time log are that it provides individuals with an objective evaluation of their time use, forces individuals to face the realities of where time is being used, helps individuals identify the problems related to time use, and reinforces the need for remedial action (Mackenzie, 1975; 1990). Time logs illustrate how the average person has little time that is unplanned or free (Mackenzie, 1975).

### *Planning*

An essential ingredient of time management is planning (Jordan et al., 1989; Lakein, 1973; Mackenzie, 1972, 1975, 1990). Planning can be defined as bringing the future into the present (Lakein, 1973) by providing individuals with the means of testing alternative actions without actually evoking the physical resources or social and personal expenses necessary to engage in the action (Smith, 1999). Planning creates a mental picture and a concrete blueprint for what needs to be done (Morris, 2001). Specifically, planning can be characterized as the formulation of a general strategy or approach and the specific strategies for addressing the details of the activity including time planning

(Kelly, 2002). Planning can reduce stress by relieving the *time crunch* (Bliss; 1976; Morris, 2001; Stevens & Pfost, 1984). By planning first and then relaxing, an individual is capable of accomplishing much more in an allocated time period. Mackenzie (1975) stated that every hour spent in effective planning saves three to four hours in execution. The greatest asset of planning is that it promotes living by action rather than by reaction (Rice, 1984). Planning takes time, but it also saves time (Drawbaugh, 1984).

### *Goal Setting*

Goals are necessary because without them individuals react erratically to opportunities and problems with little perspective (Barkas, 1984). Personal goals need to be identified (Barkas, 1984; Lakein, 1973; Morris, 2001; Soucie, 1986). After the identification of goals, many researchers suggest they be put in writing (Blanchard & Johnson, 1981; Morris, 2001; Schuler, 1979; Soucie, 1986). Written goals can be scrutinized, analyzed, refined, changed, and evaluated (Lakein, 1973). Goal setting should start with a list of the individual's lifetime goals, which may be career, personal, spiritual, community, or family orientated. Once these goals have been examined, long-term goals, or goals that can be achieved within the next three years need to be identified (Bliss, 1976; Schuler, 1979; Soucie, 1986). From these long-term goals, short-term goals that can be accomplished within the next four to six months (Soucie, 1986) need to be established. Weekly and daily objectives should follow the short-term goals (Soucie, 1986).

The goal setting process can be facilitated by listing each goal on a single piece of paper followed by the steps required to reach that goal (Blanchard & Johnson, 1981; Morris, 2001). The steps required to reach the goal should be defined in behavioral terms

(Burka & Yuen, 1983) and the specific behaviors that are needed to attain each goal should also be listed (Schuler, 1979). Goals should be observable, specific, and measurable (Morris, 2001) and must be able to be broken down into small steps (Burka & Yuen, 1983). There may be several behaviors for each goal (Schuler, 1979) and by listing each behavior it is possible for an individual to evaluate their success or failure in reaching the goal (Blanchard & Johnson, 1981). In addition, it is important to evaluate an individual's personal strengths or weaknesses that may enable or prevent success (Schuler, 1979).

Goals should be demanding in order to motivate the individuals to do their best and agreed upon by those who attempt to achieve them (Mackenzie, 1990). However, the goals should be attainable and not unrealistic (Burka & Yuen, 1983; Mackenzie, 1990). Goals should be clear, well defined (Ashkenas & Schaffer, 1985), and have deadlines, but also be flexible (Burka & Yuen, 1983; Mackenzie, 1990; Morris, 2001) so that periodic revisions can be made to ensure that the goals remain realistic (Burka & Yuen, 1983). In order to help stay-on task and avoid becoming discouraged, individuals should also build-in small rewards for each step of completion towards a larger goal (Morris, 2001). In general, goals should set the focus of how individuals spend their time (Mackenzie, 1990).

### *Prioritizing*

Once goals have been established, priorities can be set (Ashkenas & Schaffer, 1974; Jordan et al., 1989; Mackenzie, 1972, 1975, 1990; Rice, 1984; Schuler, 1979; Simpson, 1978; Stevens & Pfost, 1984). Priorities can be defined as goals and objectives that have been ranked in order of importance (Mackenzie, 1990). Two facets of prioritizing must be considered: the long range importance of the task and the short-term urgency of the task (Mackenzie, 1990). According to the *Pareto Principle*, most people spend 80% of their time performing activities that are related to only 20% of the total job results (Bliss, 1976; Mackenzie, 1972). This principle occurs because individuals fail to set priorities (Schuler, 1979).

Different criteria can result in different priorities (Lakein, 1973). Activities or responsibilities should be categorized into *trivial*, *routine,* and *innovative*, or *must do now*, *must do*, *desirable to do*, and *can wait* (Schuler, 1979). Alternatively, activities could be separated by *important and urgent*, *important not urgent*, *urgent not important*, *busy work* and *wasted time* (Bliss, 1976). One common system utilized to prioritize tasks is the *ABC* method (Jordan et al., 1989; Lakein, 1973; Simpson, 1978). The *A* represents jobs or activities of greatest importance or value to an individual's personal organizational goals. Unless, the *A* is a long-term project or a continuous goal, the *A* should be completed the same day as the prioritizing. *B* tasks are tasks of intermediate value. *C* tasks are of low value and can usually be postponed. To utilize this system, an individual must appraise the importance of each task and assign a letter according to priority. In order to employ the *ABC* system, the individual must start working with all the *A's* and not the *B's* or *C's*. It is important to understand that priorities can change over time and therefore it is imperative to set continual priorities (Lakein, 1973).

It is also necessary to include all of the priorities for daily activities on a daily plan (Rice, 1984). These priorities may include activities such as personal fitness, recreation programs, spiritual, family, social life, reading, writing, personal goals, personal matters, relaxation periods, continuing education, sleep and anything else that an individual may desire to accomplish on a daily plan.

### *Scheduling*

Scheduling follows closely upon and may overlap with planning (Drawbaugh, 1984). While planning is the envisioning of activities with an expectation of achieving them, scheduling is the assigning of fixed future dates and times to the envisioned activities for the purpose of initiating, implementing, and completing the activities (Drawbaugh, 1984; Morris, 2001; Puffer, 1989). Scheduling allows for the possibility of prediction and the resolution of temporal uncertainty (McGrath & Rotchford, 1983; Schriber & Gutek, 1987). The traditional tools for organizing a day are an engagement calendar that schedules dates and a *to do list* that itemizes activities (Taylor & Mackenzie, 1986). However, without scheduling specific amounts of time to accomplish tasks, tasks tend to take longer (Taylor & Mackenzie, 1986). One solution may be to add project sheets to an individual's use of a time planner and a to do list. Project sheets spell out the specific components of larger projects, the dates by which these component tasks should be achieved by, and the blocks of time in which to work on these tasks (Taylor & Mackenzie, 1986).

A task list should be created in order to set aside time for both essential activities and routine activities (Lakein, 1973). A task list is accomplished by listing in a *1-2-3* order everything that the individual is involved in, all the responsibilities that the individual has, and all the tasks that the individual must complete (Rice, 1984). Once the task list and priority list have been developed, the day should be divided into three parts - morning, afternoon, and evening - and an attempt made to schedule activities accordingly (Rice, 1984). The period of the day when one is most productive should also be identified in order to help the scheduling process. These time periods characterize the individual's *prime time* (Bliss, 1976; Burka & Yuen, 1983; Soucie, 1986). In order to get the most out of their prime time, individuals then need to schedule the most important activities in these periods (Soucie, 1986). Schedules, like goals, need to be flexible in order to take into account unexpected problems (Lakein, 1973). For example, Lakein (1973) suggests setting aside at least one hour per day for uncommitted time and trying to schedule absolutes early in the day to avoid panic. Once a daily schedule is accomplished, an individual should begin weekly scheduling, where daily schedules are made up one week in advance and last minute changes made the evening before. The next logical step is the monthly and then seasonal schedules or plans (Rice, 1984).

### *Organizing*

Organizing is not an event or an isolated task, it is a process (Morris, 2001). Being well organized saves time and energy and gives individuals a sense of control. Organizational techniques include managing commitments appropriately so that time is not underestimated or over committed (Stevens & Pfost, 1984), being aware of energy levels, organizing self so arrivals are not late or too early, being prepared, and avoiding procrastination (Morris, 2001). People differ in their preferences for organization (Macan, 1994, 1996; Macan et al., 1990) with some individuals making use of systems (such as filing systems), documentation (such as lists, calendars), or scheduling (Morris, 2001).

### *Establishing New and Improved Time Habits*

Most of the literature on time management concludes with the recommendation to foster new and *improved* (i.e., more effective, efficient, and appropriate) time management behaviors. For example, the examination of existing time habits may locate *extra* minutes in each day. According to several authors, one of the most conceivable areas to gain time may be by waking up earlier in the morning (Rice, 1984; Stevens & Pfost, 1984). Significant time savings can also be made by doing an entire set of similar tasks that have common priorities, such as reading and answering the mail all at one time. Conserving time is also important and can occur through the use of form letters, by controlling the length of meetings, or by delegating work (Schuler, 1979). Although establishing new and improved time management behaviors was consistently identified as separate characteristics of time management, it should be considered the summative result of applying the other time management skills and behaviors to one's life.

### *Empirical Studies of Time Management*

Of the 77 located studies or articles involving time management, 19 were empirical studies involving qualitative or quantitative time management research. Four studies examined the time management behaviors and practices of specific populations using qualitative methodologies (Hessing, 1994; Kotter, 1980; Winter et al., 1993; Yoels & Clair, 1994), eleven studies examined time management behaviors or practices (Adams & Jex, 1999; Britton & Tesser, 1991; Burt & Kemp, 1994; Francis-Smythe & Robertson, 1999; Lahmers & Zulauf, 2000; Lang, Gilpin, & Gilpin, 1990; Macan et al., 1990; Shahani, Weiner, & Streit, 1993; Simons & Galotti, 1992; Trockel, Barnes, & Eggert, 2000; Williams et al., 1995), and four studies examined the effectiveness of time management training programs (Macan, 1994, 1996; Orpen, 1993; Woolfolk & Woolfolk, 1986). Approximately half of the studies examined a university or college student sample with the remaining half examining an employed adult sample.

*Qualitative time management studies.* In reviewing the literature on time management skills and behaviors, four studies were identified which examined the time management behaviors of specific populations using qualitative methodologies (see Appendix A). Two studies examined time management techniques in relation to home-based work (Hessing, 1994; Winter et al., 1993). Of these two studies, one study exclusively examined women (Hessing, 1994). The third study examined the time management strategies of medical residents (Yoels & Clair, 1994) and the fourth study examined the work habits of successful general managers (Kotter, 1980). There were several common time management techniques identified by these populations including time manipulation, task delegation, prioritization, synchronization and routinization of activities, reallocation of personal time, goal setting, agenda making, and the utilization of a time diary. Many of the strategies that were identified by the more unique samples of dual career women, medical residents, and home based workers parallel each other and the strategies identified by university student samples.

*Quantitative time management studies.* The literature search identified eight studies that examined time management behaviors and practices in university or college student populations and three studies that examined employed adults (see Appendix B). Results from these studies showed that self-reports of time management were related to academic achievement; good time managers preferred planning and organization; older subjects and women engaged more frequently in planning and/or time management behaviors; individuals who indicated that they set goals and priorities tended toward the Type A behavior pattern; and individuals who had previous time management training engaged more frequently in time management behaviors. In addition, inefficient time use, lack of control over time demands, and inadequate amounts of time appeared to have a negative impact on individuals' psychological resources.

When measured, perceived control of time was consistently identified as the strongest correlate of all the time management behaviors. This finding indicates the importance of distinguishing between the different time management constructs (Macan et al., 1990). However, the awareness and documentation of time that are associated with time management strategies may lead some people to experience less perceived control over their time. Adams and Jex (1999) suggested that the actions of time management such as making lists and scheduling may lead some people to experience less perceived control over their time. When people are not meeting their time demands, uncompleted tasks and missed appointments on a schedule may lead to lower perceptions of control over time.

Burt and Kemp (1994) hypothesized that the ability to predict the duration of an event may provide individuals with a sense of control over time. This explanation suggests that perceived control over time is an acquired skill that develops through experience. Individuals who were more accurate in their estimation of event duration had higher perceptions of control over time. However, results showed that in general, expected duration estimates were overestimates. Overestimating task duration may be a way of controlling time and avoiding the associated time pressures and stress related to not having enough time.

*Studies examining the effectiveness of time management interventions.* The empirical literature review identified four studies that examined the effectiveness of time management training programs (see Appendix C). Results of two early studies which focused on the time management work by Lakein (1973) indicate that time management training has significant immediate and long-term effects on time management attitudes and behaviors and that those who receive time management training rate their time management effectiveness more highly than those who do not. In comparison, the two later studies which utilized the Time Management Behavior scale developed by Macan et al. (1990) found time management training to be only minimally related to subsequent use of time management behaviors. However, those individuals who participated in a time management program did perceive more control over their time after the program. Perceived control over time was related to positive outcomes: Individuals who perceived themselves as having more control over their time reported fewer job induced tensions, fewer stresses, and greater job satisfaction than individuals who did not perceive themselves as having control over their time.

Furthermore, the 1994 study by Macan was the first study to empirically examine the relationship between time management behaviors and the Theory of Planned Behavior (TPB) by investigating the relationships between the elements of the TPB and perceived control over time. This model suggested that learning time management skills and consequently engaging in time management behaviors would lead to a greater perception of control over time. Good support was found for the hypothesized process model of time management.

### *Summary*

The results of the review of time management show that the effective use of time has long been recognized as a crucial factor for success in many different fields and many practical techniques have been devised for improving time management (Puffer, 1989). Given the widespread use and acceptance of the value of time management behaviors (Jex & Elacqua, 1999), it is unfortunate that only a modest amount of empirical research has been conducted and that there is an absence of research examining time management in the exercise domain. Furthermore, research prior to 1990 tended to focus on measuring the effectiveness of time management training as a unidimensional construct, without supporting behaviors and practices.

## *Review of Time Management Instruments*

### *Introduction*

A literature review of existing instruments assessing time management in the industrial, administrative, management, education, coaching, and sport and exercise psychology domains was conducted. Sources of the review included CD-ROM searches, cross-referencing of journal articles, and hand searches of relevant journals. Similar to the review of time management skills and behaviors, the references for each article found during the database search were reviewed for additional articles that by their title, use within the article, or by referencing appeared to be related to time management for exercise. Key words used in the review included time, time management skills and behaviors, time management questionnaires, and time management instruments

In order to utilize quantitative methodologies in the study of time management skills and behaviors, instruments designed to assess these skills and behaviors are required. Unfortunately there are no published instruments designed to assess time management skills and behaviors for exercise adoption, participation, and adherence nor are there any published instruments designed to assess time management in the exercise, coaching, or sport and exercise psychology domains.

Sixteen commercially available instruments were identified that used *time* or *time management* as descriptors (Blewitt-Dombrowski, 1990; Canfield, 1976; 1981; Cooper, Sloan, & Williams, 1988; Crosby, Scherer, & Crosby, 1985; Fimian, 1988; Kaplan et al., 1988; Kirkpatrick, 1995; Morreau & Bruininks, 1991; Parry, 1985; People Builders International, Inc.; 1993; Pintrich, Smith, Garcia, & McKeachie, 1991; Training House Inc., 1995; Weinstein, 1987; Weinstein & Palmer, 1995; Wonderlic Inc. & Fasiska, 1993). Nine additional research studies involved the development of a time related assessment instrument (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Gafarian, Heiby, Blair, & Singer, 1999; Landy, Rastegary, Thayer, & Colvin, 1991; Macan et al., 1990; Schriber & Gutek, 1987; Weber & Vogel, 1977; Wessman, 1973).

### *Review of Commercially Available Time Management Instruments*

The literature review identified 16 commercially available instruments through the *Buros Mental Measurements Yearbook*. These instruments self-identified time management as a potential subscale or scale (see Appendix D). The Buros Institute of Mental Measurements provides test descriptions and critical test reviews of commercially available tests. Test reviews are written by experts in the field who must hold a Ph.D. and have measurement expertise. The instruments were all published between the years 1976 and 1995.

Seven of the instruments were developed for the employee/managers or organizational domain (Cooper et al., 1988; Crosby et al., 1985; Kaplan et al., 1988; Kirkpatrick, 1995; Parry, 1985; Training House Inc., 1995; Wonderlic Inc. & Fasiska, 1993), five were developed for students (Canfield, 1976; People Builders International, Inc.; 1993; Pintrich et al., 1991; Weinstein, 1987; Weinstein & Palmer, 1995), one was developed for teachers (Fimian, 1988), one for chronic psychiatric patients (Blewitt-Dombrowski, 1990), one for individuals with developmental delays (Morreau & Bruininks, 1991), and one for general adults (Canfield, 1981).

Of the 16 instruments, four were specifically written to assess time management (Canfield, 1976; 1981; Kirkpatrick, 1995; Training House Inc., 1995) with the remaining instruments having a time management subscale. However, none of the instruments developed specifically to assess time management were recommended by reviewers.

For example, although the *Time Perception Inventory* (*TPI*: Canfield, 1976) was developed explicitly for students who have taken time management courses and thus appeared to be very promising, it received the following negative review, "The TPI may be used as a discussion starter in seminars on effective time management but does not have a thorough rationale or a sufficiently strong technical base to support inferences of potential effectiveness in job assignments or inferences in diverse populations (McRae, 1992, p. 995). Similarly, although the *Time Use Analyzer* (Canfield, 1981) was developed to help adults clarify the importance of using time effectively in various aspects of life, it too received a negative critique: "Lack of critical information about the characteristics of the scale seriously limits general usability of the instrument (Carlson, 2001, p. 1267)".

Neither of these instruments had a theoretical basis or source for their item development or any evidence of reliability and validity.

The *Time Management Inventory* (Kirkpatrick, 1995), a subscale of the Kirkpatrick *Management and Supervisory Skills Series* aimed at all levels of managers, was developed to measure key factors in better time utilization and delegation. There was no theoretical basis for the items or reliability evidence provided. Only evidence of content validity was provided for this instrument resulting in a similar critique, "…empirical evidence to support score reliability, validity, and biases has yet to be provided. Consequently, this inventory is not recommended as there are no studies to support it as a measure of management skills (Pearson & Droegemueller, 2001, p. 646).

The final instrument developed explicitly for time management was the 25-item *Time of Your Life* instrument (Training House Inc., 1995). Time of Your Life was designed for employees as a self-assessment tool to provide "insight" into time management. Once again, no theoretical basis for item development or reliability evidence was provided. Comments were especially negative: "Little value for research, employee assessment, or employee training" (Darr, 1995, p. 1065) and "Fails to meet the barest minimum standards of scientific development" (Faunce, 1995, p. 1066).

Of the 12 remaining instruments, only two are unconditionally recommended by reviewers (*Checklist of Adaptive Living Skills:* Morreau & Bruininks, 1991 and *Teacher Stress Inventory:* Fimian, 1988). However, neither instrument's primary focus was the assessment of time management. Further, none of the ten remaining instruments examined time management for exercise adoption, participation, and adherence directly. Due to the direct cost involved with obtaining these instruments and the negative reviews associated with the majority (87.5%), none of these instruments were purchased to help build the item bank for the current time management for exercise scale.

*Review of Research Based Instruments Assessing Time and Time Management*

The review of the empirical literature identified nine instruments from the administrative, management, health, and education domains that involved the assessment of time in some manner. Four instruments were designed to directly assess time management (Britton & Tesser, 1991; Gafarian et al., 1999; Macan et al., 1990; Weber & Vogel, 1977).

The *Time Attitudes Questionnaire (TAQ:* Calabresi & Cohen, 1968) is a 46-item self-report questionnaire concerned with time experience and time attitudes. Responses are measured on a 6-point Likert-type scale ranging from *strongly disagree* to *strongly agree*. During development, the TAQ was administered to 200 psychiatric patients and 308 college students and the data submitted to a factor analysis. Results of the factor analysis showed a four factor solution: (a) Time Anxiety (discomfort and anxiety about time and the need to control time), $\hat{\alpha} = 0.79$; (b) Time Submissiveness (a dutiful and conforming attitude toward time, emphasizing efficient use of time and the use of appointments and schedules), $\hat{\alpha} = 0.56$; (c) Time Possessiveness (possessive and greedy attitude towards time) $\hat{\alpha} = 0.47$; and (d) Time Flexibility (accepting and flexible attitude towards time) $\hat{\alpha} = 0.52$. Total TAQ scores were not calculated.

The Ricks-Epley-Wessman *Temporal Experience Questionnaire* (*TEQ*) (Wessman, 1973) was developed with the view that, "the characteristic ways of experiencing and utilizing time vary greatly among individuals along dimensions that can be assessed and measured, and that these differences are meaningfully related to personality characteristics" (Wessman, 1973, p.103). The TEQ consists of 80 items with responses measured using a 7-point Likert-type scale ranging from *-3* to *+3*. The scale was originally administered to 110 predominantly male undergraduate students. Factor analysis resulted in four factors: (a) Immediate Time Pressure (harassed lack of control vs. relaxed mastery and adaptive flexibility); (b) Long-term Personal Direction (continuity and steady purpose vs. discontinuity and lack of direction); (c) Time Utilization (efficient scheduling vs. procrastination and inefficiency); and (d) Personal Inconsistency (inconsistency and changeability vs. consistency and dependability). Total TEQ scores were calculated across the four factors and ranged from -60 to +60 with a reported internal consistency (Cronbach's alpha) of 0.82.

The *Time Structure Questionnaire* (*TSQ*) is a self-report instrument developed to assess the degree to which individuals perceive their time to be structured and purposive (Bond & Feather, 1988). Originally, a set of 17 items based on Jahoda's (1981, 1982) analysis of the negative effects of unemployment on time structure was developed (Feather & Bond, 1983). Four factors underlie these items: (a) Engagement, (b) Direction, (c) Structure, and (d) Routine. The TSQ is the result of refining and improving this measure of time structure. The TSQ consists of 26 items, of which the majority are measured using a 7-point response scale ranging from *Yes, Always*, to *No, Never*. Three separate samples (ranging in size from 193 to 336 students) of introductory psychology students participated in the development of the TSQ. The responses of the first sample were factor analyzed resulting in 5 identifiable factors accounting for 41.3% of the total variance: (a) Sense of Purpose, (b) Structured Routine, (c) Present Orientation, (d) Effective Organization, and (e) Persistence. Factor analysis of both the second and third samples produced corresponding factor analytic structure. Total TSQ scores were calculated across the five factors and termed *use of time*. Mean scores on the total scale were: Sample 1, 122.6 (*SD* = 20.3); Sample 2, 117.6 (*SD* = 23.6); Sample 3, 124.8 (*SD* = 21.7). The inter-item reliabilities for use of time across the three samples were 0.88, 0.92, and 0.91 and a satisfactory level of stability was found for the total scale after a 15 week interval (test-retest reliability = 0.76).

Schriber and Gutek (1987) developed the *Time-At-Work* questionnaire to measure the temporal dimensions of organizational culture across different organizations. The instrument consists of 56 5-point Likert-type items. Participants consisted of 399 individuals from large organizations and 124 individuals from small organizations (*M* education = 15.4 years). Factor analysis results identified 16 factors accounting for 59.0% of the variance. However, thirteen separate temporal dimensions were identifiable and substantively supported: (a) scheduling and deadlines, (b) punctuality, (c) future orientation, (d) quality versus speed, (e) allocation of time, (f) time boundaries between work and non-work, (g) synchronization and coordination of work, (h) awareness of time, (i) work place, (j) sequencing of tasks, (k) intra-organizational time boundaries, (l) autonomy of time use, and (m) variety versus routine. The number of items associated with each domain ranged from 2 to 9 items and according to the authors, all domains had moderate reliabilities.

The *Time Urgency Scale* (*TUS*) was developed with the intention of assessing time urgency, time awareness, and time use (Landy et al., 1991). Time urgency refers to "accelerated pace" (Burnam, Pennebaker, & Glass, 1975) and is the tendency of an individual to consider time as a scarce resource and plan its use carefully (Landy et al., 1991). The TUS is a Likert-type self-report questionnaire consisting of 33 unique items based on the work of Edwards, Baglioni, and Cooper (1990). Initially, the TUS was developed using a sample of 190 undergraduate students. Factor analysis of this data resulted in an interpretable five factor solution: (a) Competitiveness ($\hat{\alpha} = 0.81$), (b) Eating Behavior ($\hat{\alpha} = 0.89$), (c) General Hurry ($\hat{\alpha} = 0.81$), (d) Task-related Hurry ($\hat{\alpha} = 0.72$), and (e) Speech Pattern ($\hat{\alpha} = 0.69$). This data was supplemented by additional samples of 91, 178, and 213 professionals and samples of 64 and 642 students. Factor analysis of the additional samples resulted in the same five factor solution with similar internal consistency estimates. Furthermore, test-retest reliabilities conducted after four months on the subscale responses of 213 clerical workers were all high ranging from 0.70 to 0.95. Total TUS scores were not calculated.

In a related study, Landy et al. (1991) developed behaviorally anchored rating scales of time urgency. Factor analysis of this scale resulted in nine dimensions, five of which appear to pertain to time management: (a) Awareness of Time (the extent to which an individual is aware of the exact time of day, regardless of the circumstances), (b) List Making (the extent to which a person creates or maintains a list of things to do during the day or week), (c) Scheduling (the extent to which an individual schedules activities (such as leisure, personal, and work activities) and keeps to that schedule as well as the extent to which an individual proportions time for particular activities), (d) Deadline Control (the extent to which an individual creates or appears to be controlled by external deadlines), and (e) Time Savings (the extent to which a person engages in actions directed towards saving time through more efficient planning or action). The remaining four dimensions assessed urgency behaviors including eating behavior, nervous energy, speech patterns, and tolerance of tardiness.

Of the four scales created purposively for assessing time management, the first instrument was developed by Weber and Vogel (1977). As part of a paper in recreation administration, Weber and Vogel (1971) developed a set of 20 self-report items intended to help administrators self-identify time management problems. Each item was measured on a 4-point Likert-type scale ranging from *consistently, always a problem* to *rarely or never a problem*. However, the instrument was not named nor were the psychometric properties assessed.

The *Time Management Behavior* (*TMB*) scale (Macan et al., 1990) was designed to assess the behaviors critical to the construct of time management as defined by the popular literature. Initially, 123 undergraduate students completed the 76-item TMB using a 5-point response scale ranging from 0 *seldom true* to 4 *very often true*. Following item analysis, all redundant and noncontributing items with item-total correlations of less than 0.29 were removed resulting in the 46-item TMB. An additional 165 students completed the 46-item TMB scale and factor analyses were initially conducted on each of the two samples. However, since the results were similar, the two samples were combined. Four factors accounting for 72% of the variance were retained: (a) Goal Setting and Prioritizing (eigenvalue = 7.04; $\hat{\alpha} = 0.83$; 15 items), (b) Time Management Mechanics (eigenvalue = 2.58; $\hat{\alpha} = 0.62$; 13 items), (c) Perceived Control of Time (eigenvalue = 2.08; $\hat{\alpha} = 0.69$; 13 items), and (d) Preference for Disorganization (eigenvalue = 1.26; $\hat{\alpha} = 0.60$; 5 items). Total TMB scores were calculated and ranged from 0 to 185 with a mean score of 106.4 (*SD* = 22.1) and an internal consistency of 0.83.

The *Time Management Questionnaire* (*TMQ*: Britton & Tesser, 1991) is a 35-item instrument based on the time management model developed by Britton and Glynn (1989). This model separates time management into the following seven components: (a) Choosing Goals and Sub-goals, (b) Prioritizing Goals, (c) Generating Tasks and Subtasks, (d) Prioritizing Tasks, (e) Listing Tasks on a To-Do List, (f) Scheduling Tasks, and (g) Carrying out Tasks (Britton & Glynn, 1989). Ninety male and female undergraduate psychology students participated in the development of the TMQ. Each of the 35 items was answered on a 5-point response scale consisting of the responses *always*, *frequently*, *sometimes*, *infrequently*, and *never* with higher values on the scale corresponding to better time management practices. Results of a factor analysis identified 18 items with item-factor loadings of more than 0.40 across 3 factors: (a) Short Range Planning (accounting for 16% of the total variance), (b) Time Attitudes (accounting for 11% of the total variance), and (c) Long Range Planning (accounting for 9% of the total variance). Total scores on the TMQ were calculated and ranged from 52 to 123 with a mean of 91.0 (*SD* = 14.0).

The *Diabetes Time Management Questionnaire* (*DTMQ:* Gafarian et al., 1999) is a 49-item questionnaire designed to assess general time management skills and time management skills specifically relevant to compliance to a diabetes healthcare regimen. The 49 items were derived based on a review of the time management and diabetes education and compliance literature. Time management was believed to involve a set of complex skills including behavioral outcomes such as accomplishing tasks, making and following a schedule, using a daily planner, feeling in control of one's time, prioritizing tasks, problem solving, making lists, delegating, breaking down tasks into small components, assertiveness, being organized, monitoring one's use of time, and engaging in self-reinforcement for task completion. Thus, each facet of time management was assessed with only a few items. Each item was assessed by the research team for content validity, redundancy, and clarity and only items with 100% agreement were retained. Each item was assessed using a 5-point Likert-type scale ranging from 1 *Often* to 5 *Never*. Sixty individuals with diabetes ranging in age from 19 to 82 years ($SD = 16.2$) completed the scale. Mean scores on the DTMQ ranged from 49 to 245 with a mean score of 120.6 ($SD = 21.2$). Internal consistency of the DTMQ yielded a coefficient alpha of 0.82 and two-week test-retest reliability computed on 49 responses was high ($r_{xx} = 0.81$). According to the authors of the DTMQ, "Construct validity was not evaluated by factor analysis because each of the numerous elements of time management were assessed by a single item or only a few items" (Gafarian et al., 1999, p. 590).

### *Summary*

Nine published instruments assessing time or time management were identified by the literature review but none of these instruments purposely assessed time management for exercise participation and adherence. Five instruments assessed time in some form and an additional four instruments explicitly assessed time management.

## *Critique of Research Based Instruments Assessing Time and Time Management*

The purpose of this critique was to critically examine and evaluate the nine time-related instruments in terms of validity and reliability. Each of the instruments was evaluated according to the minimum requirements of test development. These requirements include the instruments' theoretical framework, definition of the construct, and information on the psychometric properties of the instrument including validity, reliability, and item statistics (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999).

### *Validity*

Validity is an overall evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of interpretations based on all assessments including questionnaires (Messick, 1989, 1995). This comprehensive view of validity integrates considerations of content, criteria, and consequences into a construct framework (Messick, 1995). Thus, validity is a unitary concept and all validation can be thought of as construct validation (Messick, 2000). However, this does not imply that validity cannot be usefully differentiated into distinct aspects to underscore issues and nuances that might otherwise be downplayed or overlooked (Messick, 1995). Validation of an instrument calls for the integration of different sources and types of evidence (Cronbach, 1971). Therefore, for the purposes of this critique, validity will be differentiated into distinct aspects in order to critically examine the existing time management instruments. As validation is a continuing process (Messick 1995), none of the instruments reviewed are expected to be *fully* valid, but each instrument should possess some evidence of validity.

*Theoretical framework.* The construction of an instrument should begin with a theory about the behavior, which is derived from prior research (Cronbach, 1971). Thus, each of the instruments reviewed should be grounded in a theory of time or time management. Of the nine instruments identified, seven did not describe a theoretical framework for the instrument (i.e., Bond & Feather, 1988; Calabresi & Cohen, 1968; Gafarian et al., 1999, Macan et al., 1990; Schriber & Gutek, 1987; Weber & Vogel, 1979;

Wessman, 1973). The remaining two instruments were based on different theoretical frameworks (i.e, Britton & Tesser, 1991; Landy et al., 1991). For example, the TUS was based on personality theory, specifically, the Type A behavior pattern (Landy et al., 1991), while the TMQ was based on research involving computer operating systems (Britton & Tesser, 1991). Latter research involving the TMB (Macan et al., 1990) did incorporate the theory of planned behavior (Macan, 1994).

*Content validity evidence.* The content aspect of construct validity includes evidence of content relevance, representativeness, and technical quality (Lennon, 1956; Messick, 1989) including specifications of the domain boundaries and expert panel judgements (Messick, 1995).

In order to construct the initial pool of items, the boundaries of the construct domain to be assessed need to be formed, especially if the instrument is not grounded in a theoretical framework. Thus, the knowledge, skills, and other attributes that are representative of the domain need to be specified (Messick, 1989). Although the majority of the instruments (i.e., Bond & Feather, 1988; Britton & Tesser, 1991; Landy et al., 1991; Macan et al., 1990, Schriber & Gutek, 1987; Weber & Vogel, 1979; Wessman, 1973) specified domain boundaries, the boundaries differed. For example, the TMB was designed to assess "the behaviors critical to the construct of time management as defined in the popular literature" (Macan et al., 1990, p.761). These behaviors included setting goals and priorities, learning to say "no", making a to-do list, organizing, planning, delegating, and procrastinating (Macan et al., 1990). In contrast, the TAQ (Calabresi & Cohen, 1968) was designed to measure time attitudes and orientation to time but provides few boundary details. Similarly, although the DTMQ (Gafarian et al., 1999) is based on several elements of time management, the boundaries of time management were not set for this instrument. Gafarian et al. (1999) freely state that, "…the definition of time management has not been explicated." Lack of construct boundaries may pose a threat to the validity of the instrument through construct under-representation and irrelevance (Messick, 1989).

*Item and scale content relevance.* Following the definition of the construct of interest, a set of items is developed. The relevance, and thus the construct validity, of five of the scales for time management (i.e., Bond & Feather, 1988; Calabresi & Cohen, 1968; Landy et al., 1991; Schriber & Gutek, 1987; Wessman, 1973) may be threatened. Although these scales assess time in some manner, they were created for different purposes (i.e., measure time structure not time management), and therefore, not all of the content corresponds to the skills and behaviors that define time management. Despite the inherent problems with the use of any of these five scales to assess time management, the use of some subscales or items from these subscales may be appropriate.

All five scales have items that may prove to be relevant to the construct of time management for exercise participation and adherence. For example, items from the TUS (Landy et al., 1991), such as "pressed for time", "setting deadlines", and "need to excel," may be relevant to time management in the exercise domain. Similarly, items from the time anxiety (e.g., "It upsets me when I have to postpone things I plan."), time submissiveness (e.g., "I like to have a definite schedule and stick to it."), and time possessiveness (e.g., "I try to save time throughout the day by rushing.") factors of the TAQ (Calabresi & Cohen, 1968) may have relevance for a time management scale for exercise provided minor modifications are made to either the wording or context. In the same way, items from the TSQ (Bond & Feather, 1988) (e.g., "Do you have a daily routine that you follow?" and "Do you plan activities from day to day?"), the TEQ (Wessman, 1973), (e.g., "I am characteristically disposed/not disposed to overestimate the amount of work that I can do in a given amount of time." and "I am characteristically disposed/not disposed to plan and schedule time far in advance."), and the Time-At-Work questionnaire (e.g., "tasks usually take longer than planned" and "people here plan their time carefully") may be relevant and useful for a time management for exercise scale.

Despite being developed for different purposes, there are also similarities among these scales. For example, with the exception of the items comprising the time flexibility factor of the TAQ, the structured routine, effective organization, sense of purpose, and the persistence items of the TSQ (Bond & Feather, 1988), the time utilization and long term personal direction items of the TEQ (Wessman, 1973), and the time submissiveness and time possessiveness items of the TAQ are similar.

There are also similarities among subscales of instruments developed to measure other aspects of time and instruments developed explicitly for time management. The TMB has been shown to have concurrent validity through significant correlations with the TSQ ($r = .69$, $p < .001$) and the TEQ ($r = .54$, $p < .001$) (Shahani et al., 1993). Furthermore, the *Setting Goals and Priorities* (*SGP*) subscale of the TMB (Macan et al., 1990) is significantly related to the structured routine, effective organization, sense of purpose, and the persistence factors of the TSQ, the time utilization and long term personal direction factors of the TEQ, and the time submissiveness, time possessiveness, and time flexibility factors of the TAQ (Shahani et al., 1993).

Of the four instruments that were developed specifically to assess time management (i.e., Britton & Tesser, 1991; Gafarian et al., 1999; Macan et al., 1990; Weber & Vogel, 1977), all include some time management items that are directly transferable to a time management scale for exercise participation and adherence and some items that are transferable provided minor modifications are made to either the wording or context. For example, Weber and Vogel (1979) assessed goals, organization, and procrastination using three separate items. Although these items were designed specifically for managers they could be made relevant to exercise by adding the exercise participation and adherence context. Similarly, items from the TMQ (Britton & Tesser, 1991), such as “Do you plan your day before you start it”, “Do you set and honor priorities”, and “Do you have a set of goals for the entire semester?”, are relevant to exercise participation and adherence provided the items are altered to include an exercise context. Likewise items from the TMB (Macan et al., 1990) such as “I schedule activities at least one week in advance”, “I review my goals to determine if they need revising”, and ‘I feel in control of my time” are relevant to exercise participation and adherence provided the items are appropriately modified. The DTMQ (Gafarian et al., 1999) is the lone instrument to contain items explicitly assessing time management for exercise. The four exercise items from this scale possess content related evidence of validity for exercise participation and adherence and should be directly transferable to a longer exercise related time management scale. These items include: “I schedule exercise into my routine at least 3 or more times per week”, “When I exercise, it is at approximately the same time each week.”, “I set specific goals (e.g., I am going to jog 3 miles every morning at 7:00 AM) rather than general goals (e.g., I am going to start exercising more often.", and "I set goals that are reasonable (e.g., On the first day of a new exercise plan, jogging ½ mile instead of 3 miles)".

*Expert judgement.* Content relevance and representativenes of the items are traditionally appraised by expert professional judgment (Messick, 1995). The scale items need to meet the scrutiny and criticism of the experts (Cronbach, 1971) and consequently, the soundness of the instrument is no better than the writers and reviewers of the items (Cronbach, 1971). In five of the studies (Britton & Tesser, 1991; Calabresi & Cohen, 1968; Schriber & Gutek, 1987; Weber & Vogel, 1979; Wessman, 1973) the identity of the item writers were not revealed; in the remaining four studies (Bond & Feather, 1988; Gafarian et al., 1999; Landy et al., 1991; Macan et al., 1990) the research team was responsible for writing and modifying the items.

Furthermore, for the majority of the instruments (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Macan et al., 1990, Schriber & Gutek, 1987; Weber & Vogel, 1979; Wessman, 1973) there was no reference to any type of expert review of the items. For both the behaviorally anchored TUS and the DTMQ, an expert review of items was conducted, but the reviewers were either the research team or undergraduate students (Gafarian et al., 1999; Landy et al., 1991). For example, in the adaptation of the TUS to a behaviorally anchored rating scale, undergraduate students were used as expert judges of relevant time urgency dimensions, response anchors, scaling, and content validity (Landy et al., 1991). It is questionable whether undergraduate students are subject matter experts in time urgency and thus the use of undergraduate students as expert judges may weaken the validity of the scale.

The DTMQ was the only instrument to address the technical quality and clarity of the items, "The research team reviewed each item for content validity, comprehensiveness, redundancy, and clarity. Those items meeting 100% agreement were retained" (Gafarian et al., 1999, p. 588).. However, the use of the research team to judge the quality and clarity of the items developed may also be inappropriate as the judgments made may be biased.

*Structural validity.* It is not enough that expert judgments are made to test whether the content is relevant to the proposed instrument use. There is also a need to examine the structural validity, or the underlying dimensional structure, of the instrument (Messick, 1995). Factor analysis is often used as a tool for gathering construct validity evidence (Messick, 1995). Validity evidence is gathered through a match between hypothesized and statistical factor loadings. Items that by hypothesis are indicators of a certain construct are expected to show substantial loadings on the same factor. When an item loads on another factor, this shows that the indicator is impure (Cronbach, 1971). Of the nine instruments reviewed, seven were factor analyzed (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Landy et al., 1991; Macan et al., 1990; Schriber & Gutek, 1987; Wessman, 1973). However, the factor analysis results of the TEQ and the TMQ instruments (Britton & Tesser, 1991; Wessman, 1973) may be unstable due to the number of items analyzed and sample size. In each case, a large number of items ($k = 35$ and $k = 80$) were analyzed using a small number of participants ($n = 90$ and $n = 110$) (Britton & Tesser, 1991; Wessman, 1973).

Time management appears to be a multidimensional construct (Macan et al., 1990), and thus any instrument assessing time management should include several subscales and subscale scores should be calculated (Mudrack, 1997). When a total score is used to represent time management, differential relationships among subscales and between subscales and other variables will be impossible to detect due to the aggregation of the subscales (Cronbach, 1971). Of the seven instruments that were factor analyzed, five calculated subscale and total time scores (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Macan et al., 1990; Wessman, 1973) while two instruments, the Time-At-Work questionnaire (Schriber & Gutek, 1987) and the TUS (Landy et al., 1991) provided subscale scores.

There have also been problems with the use of the subscale scores for some of the instruments. Specifically, in terms of the TMB scale, the composition of the subscales has not been consistent across researchers or studies raising concerns about the comparability of research findings (Mudrack, 1997). For example, Macan (1994) modified the TMB scale resulting in a 33-item, three subscale version. Similarly, in response to the fact that the original TMB scale (Macan et al., 1990) had relatively weak factor structure coefficients of less than or equal to 0.40, Lay and Schouwenburg (1993) used a truncated 7-item versions of three of the TMB scales in their research.

In order to support a construct validity argument, confirmatory factor analysis should also be used to assess the model and the instrument. The TMB was the only scale to be factor analyzed from a confirmatory perspective. Exploratory factor analysis of the original TMB scale resulted in four factors (Macan et al., 1990). Exploratory factor analysis of later studies using the modified three subscale, 33-item version of the TMB scale resulted in a three factor solution (Macan, 1994). Confirmatory factor analysis conducted to test the underlying structure of the 33-item TMB scale using 522 employed adults (64% women) resulted in a three factor model (Adams & Jex, 1997). The three factor model was then compared to a two factor model and results showed that the three factor model was significantly better than the two factor model ($\chi^2 = 130.29$; $p < .01$).

These results provide additional support for the underlying factor structure of the TMB (Adams & Jex, 1997). Despite the belief that time management is multidimensional (Macan et al., 1990), no comparisons between a three factor TMB solution and a model with a greater number of factors have been made. This is regrettable because an exploratory examination of the factor structure of the TMB scale with 453 American working adults identified five factors (explaining 59.3% of the variance) (Mudrack, 1997).

Furthermore, the time management literature has consistently suggested that time management is composed of at least three factors. For the remaining six instruments that were factor analyzed (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Landy et al., 1991; Schriber & Gutek; Wessman, 1973), all but one (Britton & Tesser, 1991) resulted in interpretable solutions of four or more factors. Although the concept of parsimony is integral to factor analysis, parsimony can also be dangerous and threaten construct validity.

Cronbach (1971, p. 469-470) states:

> Too energetic a wielding of the scrub brush of parsimony scrapes away significant information. A baby leopard with his spots scrubbed off is no doubt a kitten, but saying that leopards have a high loading on the cat factor does not imply that one should discard the concept of *leopard* and take the kitten home for a pet.

Another threat to construct validity is construct under-representation (Cronbach, 1971). Of the four scales that propose to assess time management explicitly (Britton & Tesser, 1991; Gafarian et al., 1999; Macan et al., 1990; Weber & Vogel, 1979), not all of the scales include items that are representative of the whole domain of time management. According to popular research, time management behaviors and skills include awareness of time and self, planning, setting goals, prioritizing, scheduling, organizing, documentation, and establishing good time management habits (Barkas, 1984; Feeny Jonson, 2002; Jorde, 1982; Lakein, 1973; Mackenzie, 1972, 1975, 1990; Morris, 2001). Three of the scales appear to assess the majority of these behaviors (DTMQ, Gafarian et al., 1999; TMB, Macan et al., 1990; TMQ, Britton & Tesser, 1991) but each of the time management behaviors is only assessed using a few items. For example, the TMQ (Britton & Tesser, 1991) consists of three factors (short-range planning, time attitudes, and long-range planning) but assesses both setting goals and time management documentation with only two items. The use of only a few items to assess each time management skill and behavior may lead to an under-representation of the whole domain of time management. This source of instrument invalidity has serious adverse consequences and may negatively impact an individual's scores. Inaccurate scores, and thus inaccurate interpretations, should not occur because something relevant to the focal construct is missing (Messick, 1995).

### *Reliability*

Evidence of reliability consistent with the construct's meaning is simultaneously evidence of construct validity (Mesick, 2000). One measure of reliability is internal consistency, which is an index of both item homogeneity and item quality (Crocker &

Algina, 1986). When examinees perform consistently across items within an instrument, the instrument is said to have item homogeneity (Crocker & Algina, 1986). However, the amount, type, and quality of reliability evidence presented with each of the nine instruments were variable. For example, Weber and Vogel (1979), and Britton and Tesser (1991) did not did not present reliability evidence. Conversely, Wessman (1973), Bond and Feather (1988), and Gafarian et al. (1999) presented reliability evidence (in the form of Cronbach's alpha) for the total score but no evidence of subscale reliability. Conversely, Calabresi and Cohen (1968) and Schriber and Gutek (1987) presented only subscale reliability evidence in the form of Cronbach's alpha. Lastly, Landy et al. (1991) (using coefficient alpha) and Macan et al. (1990) (using inter-item reliability) presented evidence of both subscale and total scale reliability.

Internal consistency coefficients should also be at least 0.70 in magnitude (Nunnally, 1978). The TAQ (Calabresi & Cohen, 1968), *TMB* (Macan et al., 1990), TUS (Landy et al., 1991), and Time-At-Work questionnaire all presented subscales with internal consistency coefficients less than 0.70. For both the TAQ and the TMB, three of the four subscales had moderate internal consistency estimates ranging from 0.47 to 0.69, while one subscale of the TUS had an internal consistency estimate of 0.69 (Calabresi & Cohen, 1968; Landy et al., 1991; Macan et al., 1990). The Time-At Work questionnaire reported internal consistency estimates ranging from the low 0.50's to 0.80. In addition, despite the higher internal consistency estimate of 0.82 presented with the 49 item DTMQ (Gafarian et al., 1999), the stability of the estimate is questionable due to a very small sample size (*n* = 47).

The stability of the test scores (test-retest reliability) may also be relevant to construct validation depending upon the theory defining the construct (Cronbach & Meehl, 1955). Test-retest reliabilities are important because the users of a time management scale will most likely be interested in tracking changes over time. If respondents do not respond consistently to the items or have different ideas about what independent performance is, it may be difficult to interpret what score changes mean (Haneghan, 1995).

Three studies provided evidence of test-retest reliability (Bond & Feather, 1988; Gafarian et al., 1999; Landy et al., 1991). The estimates ranged in value from 0.76 to 0.95 with test-retest lengths of 4 months, 2 weeks, and 15 weeks, respectively. However, none of these studies provided a rationale for the test-retest time period chosen. As different test-retest estimates of reliability can occur with different use of time periods (Crocker & Algina, 1986), these results may be questionable.

### *Summary*

None of the instruments identified by the literature review are suitable for direct import into a time management for exercise participation and adherence study due to validity and reliability limitations. Thus, a time management for exercise instrument must be developed based on the most psychometrically sound time management instrument available. Of the three instruments developed specifically to assess time management and which presented information regarding the scale construction process - TMQ, DTMQ, and TMB - the TMB (Macan et al., 1990) appears to possess the strongest evidence of reliability and validity. While the TMQ (Britton & Tesser, 1991) possesses content validity for time management, the construct validity of this scale is threatened by unstable factor analysis results, construct under-representation, and a lack of reliability evidence. The DTMQ (Gafarian et al., 1999) possess content validity for time management for exercise, but it too is plagued by construct under-representation.

The TMB was created to assess the time management skills and behaviors referred to by the popular literature (Macan et al., 1990) and as such it appears to represent the majority of the domain of time management. The TMB also appears to possess adequate construct validity evidence for academic time management with undergraduate students. Despite the low subscale reliability estimates calculated from the original sample, latter studies employing the TMB have consistently shown higher subscale reliability estimates ranging from 0.77 to 0.94 (Lahmers & Zulauf, 2000; Macan, 1994; Shahani et al., 1993). Thus, the TMB appears to be an appropriate foundation for the development of time management for exercise items. Some of the TMB items could be used with their present wording or with slight modifications. The modification of items in the development of a time management for exercise scale should be guided by the four exercise specific time management items of the DTMQ (Gafarian et al., 1999). Items from the remaining instruments could also be used as templates as long as modifications are made to the wording and context of each item.

# CHAPTER FOUR

## Initial Development and Validation of the Time Management Scale for Exercise

### *Introduction*

The procedures followed to develop and validate the TIMES are described in three sections within the present chapter. The first section includes a description of the development and validation of the item pool and domains to which the items are referenced. The second section describes the expert panel procedures used to verify the structure of the domain of exercise-related time management and to assess the relevancy and representativeness of the items constructed to characterize the domain and its subdomains. The third section contains the results of the expert panel procedures and a small pilot study conducted with four university students to determine the readability and clarity of the items.

Given the sequential nature of the development and validation process, the description of the methodology will be immediately followed by presentation and discussion of the results for that section. The empirical validation methodology and results based on the first field study are presented in the fifth chapter. Chapter six presents the methodology and results based on the second field study.

### *Development of the Time Management Exercise Scale*

#### *Content Specifications*

The TIMES was developed to measure time management skills and behaviors relevant to exercise adoption, participation, and adherence. Despite the current trend advocating lifestyle changes and physical activity participation (WHO, 2004a), exercise was chosen as the context for this instrument due to its framework and explicit definition:

Exercise is a subset of physical activity that is planned, structured, and repetitive and is purposively performed to improve or maintain physical fitness (Centers for Disease Control and Prevention, 1997). In comparison, physical activity is defined as any bodily movement produced by skeletal muscle which results in energy expenditure (Centers for Disease Control and Prevention, 1997). This delineation between exercise and physical activity is necessary to narrow and clarify the domain specifications (Fitzpatrick, 1983), thereby allowing time management items to be written specifically for one behavior.

As a strong theoretical model of time management is required as a basis for the instrument (American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education, 1999), the skills and behaviors that define time management for exercise were established by reviewing scholarly and popular literature on time management (Fiske, 1971; Kifer, 1977). This review led to the identification of seven characteristics or potential dimensions of time management for exercise. These characteristics together with the definition of each subscale are listed in Table 2. As shown, it was proposed that the TIMES would contain the following seven subscales: *Setting Exercise Goals, Prioritization of Exercise, Scheduling Exercise, Exercise Organization, Awareness of Time and Exercise Suitability, Exercise Documentation,* and *Exercise and Time Management Preferences and Emotions.*

Table 2

*Hypothesized Content Definitions for the Time Management Exercise Scale*

| Subscale | Definitions |
|---|---|
| Setting Exercise Goals (SEG) | Goal setting behavior including the setting of personal, long term, short term, specific, challenging, realistic, measurable, and flexible goals related to exercise participation and adherence. |
| Prioritization of Exercise (EP) | Focused commitment to exercise, acknowledgement of the importance of exercise relative to other behaviors like job and household chores, and the inclusion of exercise as a priority for the week and month. |
| Scheduling Exercise (SE) | Scheduling exercise activities consistently, regularly, monthly, and in advance. |
| Exercise Organization (EO) | Exercise-related time organization including the preparation, conservation, efficiency, and partitioning of exercise activities. |
| Awareness of Time and Exercise Suitability (ATES) | Accuracy in estimating the time required for exercise, time appropriateness and compatibility of chosen exercise activities, time limitations for exercise, and exercise procrastination. |
| Exercise Documentation (ED) | Monitoring, recording, and documenting exercise activities through the use of notes, to do lists, calendars, diaries, logs, written schedules, and day-timers. |
| Exercise and Time Management Preferences and Emotions (ETMPE) | Chronicity (time) preferences and preferences for exercise organization, routines, structure, and schedules. Feelings of anxiety, guilt, and stress over lack of time for exercise. |

### *Item Development*

There is currently no established time management for exercise scale designed to assess the behaviors critical to the construct of time management for exercise. Therefore, existing research-based time management scales from the educational and industrial domains were considered. These items and scales included the 20 items from the Weber and Vogel (1979) scale, the Diabetes Time Management Questionnaire (Gafarain et al., 1999), the Temporal Experience Questionnaire (Wessman, 1973), the Time Attitude Questionnaire (Calabresi & Cohen, 1968), the Time Management Behavior scale (Macan et al., 1990), the Time Management Questionnaire (Britton & Tesser, 1991), the Time Structure Questionnaire (Bond & Feather, 1988), and the Time Urgency Scale (Landy et al., 1991. Appropriate items from the 46-item TMB scale (Macan, 1994) were used as the foundation for the item pool. Item revisions were based on the four exercise items of the Diabetes Time Management Questionnaire (Gafarian et al., 1999) and appropriate items from the remaining scales were selected and modified for the exercise domain. In addition, new exercise related time management items were created based on the seven time management characteristics identified in the literature review and following the criteria suggested by Edwards (1957).

An initial pool of 91 items, with 13 items per subscale, was developed. Provided that the latent structure of the TIMES was verified, and that each of the seven components was found to be equally important, it was hypothesized that 8 to 10 items would be needed for each of the subscales retained in the final form in order to achieve the recommended *minimum* internal consistency coefficient of 0.70 (Nunnelly, 1978; Nunnelly & Bernstein, 1994; Thorndike, 1982). However, since research has shown that internal consistency values of 0.80 for 10 items and 0.90 for 20 items are obtainable with well designed items (Rogers, 2000), internal consistency values greater than 0.80 were desired.

*Item and Response Format*

The intent of the TIMES was to have respondents describe their current time management behavior according to the content of each item. A five-point Likert-type response scale was chosen because Likert based his scaling procedure on a normally distributed set of responses across a five-point scale (Likert, 1932, 1970).

Although some researchers advocate anchoring all response options so that examinees have a common reference point in which to evaluate each item (Benson, 1998), in order to obtain an interval level of measurement (Lam & Klockars, 1982; Likert, 1932), the response scale was anchored only at the endpoints: 0 (*does not describe me at all*) to 4 (*describes me very well*) (see Figure 1). According to Likert (1932), participants presented with a response scale anchored only at the endpoints would first attach meaning to the interior points by partitioning the distance between the points into equal intervals and then choose the closest option to their true position.

I accurately estimate the amount of time it takes to exercise.

| | | | | |
|---|---|---|---|---|
| **Does Not Describe Me At All** | | | | **Describes Me Very Well** |
| ☐ | ☐ | ☐ | ☐ | ☐ |

*Figure 1.* TIMES Item 2-8, second Awareness of Time and Exercise Suitability item, eighth TIMES item overall.

In order to prevent a response bias, the polarity of approximately one third (37.4%) of the items was reversed. Including both positive and negative statements in the scale help avoid a response set and help to establish direction. Further, to avoid possible bias brought about by items within each subscale appearing one after another, subscale items were randomly interspersed (Rogers, 2000).

### *Content Related Evidence of Validity Methodology*

As explained by Messick (1983), "in practice, content-related evidence [of validity] usually takes the form of consensual informed judgments about the representative coverage of content in a test and about its relevance to a particular behavioral domain of interest" (p. 38). Expert judges are needed to assess the relevancy of each item to the domain and for the population of interest and to assess the representativeness of the set of items retained (Rogers, 2000). Information is generally acquired from individuals who have personal experience with the construct under investigation (Crocker & Algina, 1986).

#### *Characteristics of Panel Members*

Health and exercise psychologists were approached to make the judgments about the relevance of each item and the representativenesss of the items. Each judge was required to have a Ph.D. or to be near to completion of a Ph. D. in sport and exercise psychology or a closely related discipline, an established publication record in exercise psychology, and be employed in a physical education, kinesiology, exercise science, or health promotion department at a North American university.

### *Recruitment of Panel Members*

Twenty-four experts were initially contacted by electronic mail and invited to participate in the study. The experts were asked to indicate their willingness and availability to participate in the assessment of the items within a three-week window. Content validity rating scale packages together with pre-paid self-addressed stamped envelopes were then mailed to willing participants early in February 2002. Follow-up of non-responders was made via electronic mail at 3 weeks post-original mailing.

### *Description of Content Validity Rating Package*

The task of the panel members was to judge the degree of fit between the questionnaire items and the exercise related time management characteristics to which the items were referenced (Hambleton, 1980). The panel members were provided with an introductory letter and a series of four sealed envelopes to be opened in sequential order. The first envelope contained a copy of the 91-item TIMES. Each panel member was first asked to complete the 91-item TIMES. After completing the questionnaire, the panel members were then instructed to open the second envelope. The second envelope contained a copy of the content specifications of the domain of time management for exercise. The panel members were then asked to read the definition of each subscale (see Table 2). If the panel members had any questions, they were asked to contact the researcher immediately. Following this, they were instructed to open the third envelope. The third envelope contained the instructions for the item content review and all of the materials necessary to complete the review. The fourth and final envelope contained the background questionnaire, which consisted of demographic and time management items and items regarding exercise psychology/counseling experience.

Given the time consuming nature of the item review, the items were presented to the panel members by subscale. In order to avoid panel members rating all items in a subscale highly due only to their presence in the subscale, one imposter or "lie" item was added to each subscale. The inclusion of lie items can also help to evaluate the expertise of the panel members and the care with which they completed their ratings. Each lie item was a duplicate item from one of the six other subscales. Thus, the panel members rated 14 items (13 real items and 1 lie item) for each subscale.

The item content review consisted of four steps. First, each panel member independently reviewed the 91 TIMES items using the following question: "Using a 5-point Likert-type rating scale anchored by the endpoints: 0 (*no fit*) to 4 (*excellent fit*), how well do you think the item *reflects* the subscale specifications it was written to measure?" The panel members were requested to judge each item solely on the basis of the match between its content and the content defined by the subscale specifications that the item was originally intended to measure. If panel members selected the option 0 (*no fit*) for any item, they were requested to provide an explanation and indicate with which subscale this item would fit.

Second, in order to assess item representativeness, panel members were requested to further consider the items they indicated as fitting the subscale specifications with a rating of *3* or *4*. For each subscale, the panel members were asked the following question: "Do the items you rated as a "3" or a "4" together represent the category specified (e.g., Setting Exercise Goals). If "no", please indicate what items should be added."

Third, the panel members were asked four open-ended questions regarding item clarity and readability:

1. Given your knowledge, understanding, and experience with time management for exercise participation and adherence, do you think that the TIMES items are clear and free of any irrelevant material? If "no", please explain.
2. Given your experiences working with undergraduate students, do you think that the reading level of these items is appropriate for undergraduate students? If "no", please explain.
3. Given your experiences, do you think that the reading level of these items is appropriate for people who want to initiate an exercise program? If "no", please explain.
4. Given your experiences, do you think that the reading level of these items is appropriate for people who want to maintain or increase their exercise program? If "no", please explain.

Lastly, panel members were asked two open-ended questions regarding the number of subscales:

1. Given your knowledge, understanding, and experience with time management for exercise participation and adherence, do you think that any of the seven categories can be combined? If "yes", please explain.
2. Given your knowledge, understanding, and experience with time management for exercise participation and adherence, do you think there are any missing categories that should be included? If yes, please explain.

Throughout the item review process panel members were provided with the opportunity to comment on each item in addition to constructing any additional items they deemed appropriate. All questionnaire responses were treated confidentially. A copy of the item content rating package, including the informed consent, introduction letter, item review, subdomain specifications, and background questionnaire, is provided in Appendix E.

*Assessment of Item Ratings*

The responses of the panel members were collected and entered into the Microsoft Excel computer program with 100% verification. Frequencies and descriptive statistics, including measures of central tendency and variability, were then calculated for all demographic and background variables.

*Identification of "lie" items.* The panel members' ratings of the items constituting each of the subscales were examined to assess whether panel members responded in the same manner to all items (including the "lie" items). Lie items were considered unrecognized by the panel members if the panel members rated these items in the same manner as all other items or gave the lie item a rating of "good" (3) or "excellent" (4) fit. Unrecognized lie items provided evidence that the member either did not understand the task or did not understand the domain of reference. If sufficient evidence of misunderstanding existed across all subscales for a specific panel member, then the panel member was deleted from further analysis.

*Inter-judge agreement.* In order to assess inter-judge agreement and the possible presence of aberrant judges for each subscale, the discrepancy between the rating score for each panel member and the median of all panel members' scores was calculated for each item and summated across all items in the subscale ($JDM_{js}$). The formula for $JDM_{js}$ (Rogers, 2000) is as follows:

$$JDM_{js} = \sum_{k=1}^{K_s} \left| X_{kjs} - Md_{ks} \right|,$$

where

$X_{kjs}$ is the rating given by judge $j$ to item $k$ in subscale $s$;

$Md_{ks}$ is the median of the ratings given by the $J$ judges to item $k$ in subscale $s$; and

$K_s$ is the number of items in subscale $s$.

Ideally there will be perfect agreement among the panel members on all items and each panel members' discrepancy from the median is zero. If the $JDM_{js}$ for a panel member exceeded the range of $JDM_{js}$'s for the remaining panel members, the panel member's ratings were considered to be outliers for that subscale. The amount by which an aberrant judge exceeded the remaining judges was set at the time the $JDM_{js}$'s were computed. Aberrant judges tend to occur because they do not understand the task they are required to complete and/or the domain that is being assessed. The outlying panel member's scores were then examined further to establish whether the panel member provided item revision suggestions that accounted for the outlying scores.

*Item relevance.* Item relevance or item fit was examined by assessing: (1) the degree of ambiguity among the judges' ratings for the item, (2) the central tendency of the judges' ratings for the item, and (3) the content validity coefficient for each item.

The degree of item ambiguity was assessed by examining the range, $R_k$, of the judges' ratings for each of the items (Rogers, 2000). For item $k$,

$$R_k = X_{kjH} - X_{kjL} + 1,$$

where $X_{kjH}$ and $X_{kjL}$ are, respectively, the highest and lowest ratings for the item. Ideally, values of $R_k$ should be 1. This value occurs when the highest and lowest ratings are the same. Substantial ambiguity in the fit of an item is represented by large values of $R_k$. Due to the judgmental nature of this process, unacceptable $R_k$ values could not be determined *a priori*. Large observed $R_k$ values questioned the fit of the item to the referenced subscale and motivated further examination for insight into why the item was ambiguous.

Second, the central tendency of the judges' ratings for each of the items was examined to assess whether panel members believed there was a fit between the item and the subscale to which it was referenced. The median values ($Md_k$) were used because aberrant item ratings adversely affect the mean. Larger median values indicate better fit or more relevant items. Since the items were assessed using a scale ranging from 0 (*no fit*) to 4 (*excellent fit*), items required a median score of at least 2.75 in order to meet the criteria of item relevance.

Third, item content validity coefficients ($VI_k$) (Aiken, 1985) were calculated. Item content validity coefficients provide a method of statistically testing the significance of agreement among the judges' ratings for the subscale specification that each item was designed to measure. $VI_k$ was calculated from the following formula (Aiken, 1985):

$$VI_k = S/[j(c-1)],$$

where

$VI_k$ = the validity coefficient for item $k$,

$j$ = the number of raters, and

$c$ = the number of rating categories.

In order to calculate $S$, each of the rater's validity ratings were first transformed to

$$s_j = r_j - lo$$

where "lo" equals the lowest validity category and $r_j$ is the rater $j$'s validity rating of the item. Since the validity ratings were conducted on a five-point scale ranging from 0 to 4 with "4" assigned to the highest validity category and "0" representing the lowest category, in this study, $s_j = r_j$. The values of $s_j$ were then summed across all $j$ judges to produce $S$.

The coefficients range from 0 to 1, with high values of $VI_k$ indicating that an item has high content validity. Ideally, values of $VI_k$ will be close to 1.0. The statistical significance of $VI_k$ was obtained by comparing the computed value of $VI_k$ against a right-tailed binomial probability table provided by Aiken (1985, p.134). However, this table provides only the critical values of $VI_k$, which have "right-tailed probabilities close to but not greater than the 0.01 and 0.05 levels" (Aiken, 1985, p. 133). According to Dunn, Bouffard, and Rogers (1999), the 0.01 level of significance should be considered a conservative estimate of significance for any $VI_k$ coefficient deemed significant at $p < .01$ in this table (p. 134). Due to the conservativeness of an alpha level set to .01 and the exploratory nature of this study, the significance level was set to .05.

*Item representativeness.* To assess item representativeness, the panel members were requested to further examine the items they indicated as fitting each of the subscale specifications with a rating of 3 (*good fit*) or 4 (*excellent fit*) (i.e., relevant items). Adequate representation of each of the subscales was assumed if at least 8 items per subscale were found to be relevant by the majority of the judges.

*Reading level and item clarity.* The responses of the panel members to the questions pertaining to reading level and item clarity were examined and summarized. In order to further illuminate the summary statistical findings, all the feedback provided by the panel members in response to the open-ended questions was considered.

## *Content Related Evidence of Validity Results*

### *Recruitment of Panel Members*

Initially 24 exercise, sport, and health psychologists were contacted via e-mail and asked to participate as panel members in this study. Of the 24 professionals contacted, 14 (58.3%) expressed preliminary interest and were sent the rating package. Eight of the 14 experts (57.1%) completed the rating scale package within the allotted three-week time frame and a further two (14.3%) responded within the next six months. One additional expert responded within the allotted time frame but did not fully complete the rating scale package and was therefore not included in the analyses.

### *Characteristics of Panel Members*

Nine of the ten panel members were male. Nine panel members possessed a doctoral degree; a tenth was working on his doctoral dissertation. All panel members were employed in a physical education, kinesiology, exercise science, or health promotion department at a North American university. Eight members had an established publication record in exercise participation or adherence. Nine panel members had been involved in programs dealing with exercise participation or adherence, with 12.7 mean years of experience (*SD* = 5.8). Of the ten panel members, four had additional expertise in exercise counseling, with their years of experience ranging from 5 to 14 years (*M* = 8.5 years, *SD* = 4.4) and their type of experience ranging from personal trainer to certified fitness counselor. Formal experience with time management varied across the panel members: the doctoral candidate was the only panel member to conduct time management workshops and presentations, two other panel members had attended formal time management workshops, and the remaining seven panel members had no formal training in time management. Five of the panel members also reported informal experience with time management through the reading of time management materials.

### *Assessment of Item Ratings*

An example of the results of the panel member's ratings for each item is presented in Figure 2.

| Subscale | Setting Exercise Goals |
|---|---|
| Item 7-44 | I set short term exercise goals for what I want to accomplish each week. |

| Judge | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rating | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 |
| **Range** | 2 | | | | | | | | | |
| **Median** | 4 | | | | | | | | | |

*Figure 2.* Example of panel member's ratings for the seventh item in the subscale Setting Exercise Goals, item 44 in the overall TIMES.

The complete results of the panel members' ratings for each item within each subscale are presented in seven tables in Appendix F. Summary tables of the results are presented and discussed in the text.

*Identification of "lie" items.* The panel member's ratings of the "lie" item imbedded in each subscale are presented in Table 3. Lie items were considered recognized if they were scored as "0", "1", or "2" and considered unrecognized if they were scored a "3", "4" or if no score was provided.

Table 3

*Results of Lie Item Ratings*

| | *Subscale* | | | | | | | # Id | % ID |
|---|---|---|---|---|---|---|---|---|---|
| **Judge** | **GS** | **EP** | **SE** | **EO** | **ATES** | **ED** | **ETMPE** | | |
| **Judge 1** | √ | — | √ | √ | √ | √ | √ | 6 | 86 |
| **Judge 2** | √ | √ | — | — | — | √ | — | 3 | 43 |
| **Judge 3** | √ | √ | √ | √ | — | √ | √ | 6 | 86 |
| **Judge 4** | √ | √ | √ | √ | √ | √ | √ | 7 | 100 |
| **Judge 5** | √ | — | √ | — | √ | — | — | 3 | 43 |
| **Judge 6** | √ | √ | √ | √ | √ | √ | √ | 7 | 100 |
| **Judge 7** | — | √ | — | — | — | √ | √ | 3 | 43 |
| **Judge 8** | √ | √ | — | — | — | √ | √ | 4 | 57 |
| **Judge 9** | — | √ | √ | — | — | √ | √ | 4 | 57 |
| **Judge 10** | √ | √ | — | — | — | √ | √ | 4 | 57 |
| **Total # J Id** | 8 | 8 | 6 | 4 | 4 | 9 | 8 | | |
| **Overall % J Id** | 80 | 80 | 60 | 40 | 40 | 90 | 80 | | |

*Note.* Total # J Id refers to total number of judges who identified the lie item for each subscale. Overall % J ID refers to overall percentage of judges who identified the lie item for each subscale. # Id refers to the number of lie items each judge identified. % ID refers to the percentage of lie items identified by each judge. — represents lie item unidentified. √ represents identified lie item.

The number of identified lie items ranged from 3 to 7 with a median of 4. Two of the judges (judge 4 and judge 6) identified all seven lie items and two judges (judge 1 and judge 3) identified six lie items. Three of the judges had difficulty with this task (judges 2, 5, and 7) and were only able to identify three of the lie items. Nine of the judges identified the Exercise Documentation lie item and eight judges identified the Setting

Exercise Goals and Exercise Priorities lie items. The most difficult lie items for the judges to recognize were the lie items imbedded in the Exercise Organization (identified by only four judges) and Awareness of Time and Exercise Suitability (identified by only four judges) subscales. Despite the poor performance of three of the judges (judges 2, 5, and 7), none of the judges were eliminated from further analysis because the pattern of identification was similar across all judges. Judges 2, 5 and 7 were able to correctly identify the most commonly identified lie items but like other judges had problems identifying the lie items imbedded in the Exercise Organization and Awareness of Time and Exercise Suitability subscales as well as the lie item located in the Scheduling Exercise subscale (judge 8 and judge 10 also did not identify these items).

It appears as if some of the lie items may have been indistinguishable from the true items especially for the Exercise Organization, Awareness of Time and Exercise Suitability, and Scheduling Exercise subscales. In retrospect, some of the more ambiguous lie items may have fit more than one subscale well.

*Inter-judge agreement.* The discrepancy value ($JDM_{js}$) for each panel member is reported in Table 4. Judges were considered aberrant when their $JDM_{js}$ score for a subscale remained outside the range of the remaining judges' scores by 10 or more points after their score was removed. Using this criterion, judge 9 appeared to be the only aberrant judge on four of the seven subscales.

Table 4

*Subscale and Overall Aberrant Judge Scores*

| | **Subscale** | | | | | | |
|---|---|---|---|---|---|---|---|
| | **SEG** | **EP** | **SE** | **EO** | **ATES** | **ED** | **ETMPE** |
| **Judge 1** | 9.5 | 7.0 | 3.0 | 5.0 | 9.5 | 2.5 | 18.0 |
| **Judge 2** | 5.5 | 7.0 | 7.0 | 11.0 | 4.5 | 4.5 | 2.0 |
| **Judge 3** | 13.5 | 16.0 | 18.0 | 23.0 | 18.5 | 21.5 | 21.0 |
| **Judge 4** | 10.5 | 23.0 | 21.0 | 18.0 | 7.5 | 6.5 | 12.0 |
| **Judge 5** | 6.5 | 8.0 | 8.0 | 10.0 | 12.5 | 9.5 | 7.0 |
| **Judge 6** | 8.5 | 17.0 | 19.0 | 9.0 | 11.5 | 17.5 | 7.0 |
| **Judge 7** | 7.5 | 9.0 | 3.5 | 8.0 | 5.5 | 3.5 | 5.0 |
| **Judge 8** | 7.5 | 3.0 | 7.0 | 4.0 | 4.5 | 2.5 | 2.0 |
| **Judge 9** | 11.5 | 19.0 | 11.0 | **33.0** | **33.5** | **31.5** | **39.0** |
| **Judge 10** | 3.5 | 5.0 | 3.0 | 2.0 | 7.5 | 7.5 | 2.0 |
| Min | 3.5 | 3.0 | 3.0 | 2.0 | 4.5 | 2.5 | 2.0 |
| Max | 13.5 | 23.0 | 21.0 | 33.0 | 33.5 | 31.5 | 39.0 |

*Note.* Subscales are presented in this table. Min = minimum value. Max = maximum value.

Inspection of the ratings provided by judge 9 revealed the high values for $JDM_{js}$ occurred due to this judge selecting 0 (*no fit*) or by providing no response for the majority of the items on the last four subscales (see Table 3). For example, for the subscale Exercise Organization (EO), judge 9 had an outlying $JDM_{js}$ score of 33.0 that was primarily caused by providing no response to 9 of the 13 items. Similarly, for the subscale Exercise Documentation(ED), judge 9 had an outlying $JDM_{js}$ score of 31.5 that was essentially caused by selecting 0 (*no fit*) for 7 of the items and by not responding to one additional item.

However, as no judges were aberrant across all subscales and in the interests of maximizing the number of judges (Haynes, Richard, & Kubany, 1995), it was decided to remove aberrant judges from only those subscales where their $JDM_{js}$ scores were outliers. Thus, judge 9 was removed from further analysis of Exercise Organization, Awareness of Time and Exercise Suitability, Exercise Documentation, and Exercise and Time Management Preferences and Emotions. Following the removal of the aberrant judge, the $JDM_{js}$ scores were re-calculated (see Table 5).

Table 5

*Subscale and Overall $JDM_j$ Scores With Aberrant Judge Removed*

| | Subscale | | | | | | |
|---|---|---|---|---|---|---|---|
| | **SEG** | **EP** | **SE** | **EO** | **ATES** | **ED** | **ETMPE** |
| **Judge 1** | 9.5 | 7.0 | 3.0 | 5.0 | 9.0 | 2.0 | 18.0 |
| **Judge 2** | 5.5 | 7.0 | 7.0 | 11.0 | 4.0 | 4.0 | 2.0 |
| **Judge 3** | 13.5 | 16.0 | 18.0 | 23.0 | 19.0 | 22.0 | 21.0 |
| **Judge 4** | 10.5 | 23.0 | 21.0 | 18.0 | 8.0 | 6.0 | 12.0 |
| **Judge 5** | 6.5 | 8.0 | 8.0 | 10.0 | 13.0 | 10.0 | 7.0 |
| **Judge 6** | 8.5 | 17.0 | 19.0 | 9.0 | 11.0 | 18.0 | 7.0 |
| **Judge 7** | 7.5 | 9.0 | 3.5 | 8.0 | 5.0 | 3.0 | 5.0 |
| **Judge 8** | 7.5 | 3.0 | 7.0 | 4.0 | 5.0 | 2.0 | 2.0 |
| **Judge 9** | 11.5 | 19.0 | 11.0 | **R** | **R** | **R** | **R** |
| **Judge 10** | 3.5 | 5.0 | 3.0 | 2.0 | 7.0 | 8.0 | 2.0 |
| Min | 3.5 | 3.0 | 3.0 | 2.0 | 4.0 | 2.0 | 2.0 |
| Max | 13.5 | 23.0 | 21.0 | 23.0 | 19.0 | 22.0 | 21.0 |

*Note.* Subscales are presented in this table. **R** in bold type represents removed judge. Min = minimum value and Max = maximum value.

*Item ambiguity*. Although substantial ambiguity in the fit of an item is represented by high values of $R_k$, no firm criterion could be set *a priori* due to the judgmental nature of this process. Thus, after consideration of all 91 $R_k$ values (see Table 6), the criterion was initially set at 3 and items with values of $R_k$ falling above 3 were considered ambiguous.

Table 6

*Item Ambiguity: Range of Judges' Ratings for Each Item*

| | **Subscale** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Item** | **SEG** | **EP** | **SE** | **EO** | **ATES** | **ED** | **ETMPE** |
| **Item 1** | **5** | 2 | **5** | 3 | 3 | **5** | 3 |
| **Item 2** | 3 | 2 | **5** | **5** | 2 | 3 | **5** |
| **Item 3** | **4** | 2 | **5** | **4** | **4** | 3 | **5** |
| **Item 4** | **5** | **4** | **5** | **4** | **5** | 1 | **5** |
| **Item 5** | **4** | **5** | **5** | **5** | **5** | **5** | **4** |
| **Item 6** | **5** | **5** | **5** | **4** | 3 | **5** | **5** |
| **Item 7** | 2 | 1 | **4** | **5** | **4** | **5** | **4** |
| **Item 8** | 2 | 3 | **5** | 2 | **5** | **5** | **4** |
| **Item 9** | 2 | **5** | 1 | **4** | **5** | **4** | **5** |
| **Item 10** | 3 | **4** | 2 | **5** | **4** | **4** | **4** |
| **Item 11** | 2 | **5** | **5** | **4** | **4** | 3 | **4** |
| **Item 12** | **4** | 2 | 2 | 3 | 2 | **5** | 2 |
| **Item 13** | **4** | **4** | **5** | **4** | **4** | **5** | **4** |
| **Number of ambiguous items** | 7 | 7 | 10 | 10 | 9 | 9 | 11 |

*Note.* Items are identified by subscale number only, i.e., Item 1 SEG refers to the first item of the SEG subscale. Numbers in bold type represent values of 4 or 5 that fall above the criterion indicating the possibility of an ambiguous item.

Sixty-three ambiguous items were identified using this criterion. However, for approximately half of these items (54.0%), the large values were due to one or more outliers for that item. For example, the $R_k$ value for the Scheduling Exercise item "I reserve time in my daily schedule for exercise activities" was "5". This large value was due to the fact that judge 5 rated the item as *no fit* while the remaining panel members rated the item as *excellent fit*. Similarly, while the Scheduling Exercise item "I exercise consistently" appeared to be a poor item with nine judges rating the item as *no fit,* it too received an $R_k$ value of "5". The high $R_k$ value was due to the fact that judge 9 rated the item as *excellent fit*. Consequently, three classes of range items were developed: (1) close agreement among panel members resulting in a low $R_k$ value, (2) close agreement among the majority of panel members with one or two outliers resulting in a high $R_k$ value, and (3) disagreement among raters with no outliers resulting in a high $R_k$ value (i.e., essentially a rectangular distribution of judges ratings across the five rating scales). Results of this reclassification identified 27 items meeting the original $R_k$ criteria, 30 items with high $R_k$ values due to one or two outlying values, and 34 ambiguous items (see Table 7).

Table 7

*Item Ambiguity: Classification of Items According to Range of Judges' Ratings*

| | Subscale | | | | | | |
|---|---|---|---|---|---|---|---|
| **Item** | **SEG** | **EP** | **SE** | **EO** | **ATES** | **ED** | **ETMPE** |
| **Item 1** | **3** | 1 | **3** | 1 | 1 | **3** | 1 |
| **Item 2** | 1 | 1 | **3** | **3** | 1 | 1 | 2 |
| **Item 3** | 2 | 1 | 2 | **3** | **3** | 1 | 2 |
| **Item 4** | **3** | 2 | **3** | 2 | **3** | 1 | 2 |
| **Item 5** | **3** | **3** | **3** | **3** | 2 | 2 | 2 |
| **Item 6** | 2 | **3** | 2 | **3** | 1 | 2 | **3** |
| **Item 7** | 1 | 1 | **3** | **3** | 2 | 2 | **3** |
| **Item 8** | 1 | 1 | **3** | 1 | 2 | **3** | **3** |
| **Item 9** | 1 | 2 | 1 | 2 | **5** | 2 | 2 |
| **Item 10** | 1 | **3** | 1 | **3** | 2 | 2 | 2 |
| **Item 11** | 1 | **3** | 2 | **3** | 2 | 1 | 2 |
| **Item 12** | **3** | 1 | 1 | **3** | 1 | **3** | 1 |
| **Item 13** | 2 | **3** | **3** | 2 | **3** | **3** | 2 |
| **# of items with a "3" classification** | 4 | 5 | 7 | 8 | 3 | 4 | 3 |

*Note.* Items are identified by subscale number only, i.e., Item 1 SEG refers to the first item of the SEG subscale. 1 refers to low $R_k$ values due to close agreement among panel members. 2 refers to high $R_k$ values due to close agreement among the majority of panel members with one or two outliers. 3 refers to high $R_k$ values due to disagreement among raters with no outliers indicating ambiguous items.

*Item relevance.* The median values of the ratings for all 91 items are reported in Table 8. In order to meet item relevance criteria, a minimum median score of 2.75 was required. The majority (89.0%) of the items had median scores of at least 2.75 and 48.4% of the items had a median score of 4. The subscales with the greatest number of fitting items were Exercise Documentation ($k = 13$) and Exercise and Time Management Preferences and Emotions ($k = 13$).

Separate values of $VI_k$ were calculated for each of the items. The $VI_k$ statistic was significant for 58 of the 91 items ($p < .05$). Across the subscales, the number of statistically significant values of $VI_k$ ranged from 6 (Awareness of Time and Exercise Suitability) to 11 (Scheduling Exercise) (see Table 9).

Table 8

*Median of Judges' Ratings for Each Item*

| | Subscale | | | | | | |
|---|---|---|---|---|---|---|---|
| **Item** | **SEG** | **EP** | **SE** | **EO** | **ATES** | **ED** | **ETMPE** |
| **Item 1** | 3 | 4 | 3 | 3 | 3 | 4 | 3 |
| **Item 2** | 3 | 4 | 3.5 | 3 | 4 | 4 | 3 |
| **Item 3** | 4 | 4 | 4 | 3 | **1** | 4 | 4 |
| **Item 4** | **1.5** | 4 | **2.5** | 4 | **2** | 4 | 4 |
| **Item 5** | 3 | **2.5** | **0** | **2** | 3 | 3 | 3 |
| **Item 6** | 3 | 3 | 4 | 3 | 3 | 4 | 3 |
| **Item 7** | 4 | 4 | 3 | 3 | 3 | 4 | 3 |
| **Item 8** | 3 | 4 | 3 | 4 | 3 | 3 | 3 |
| **Item 9** | 4 | 4 | 4 | 4 | 3 | 4 | 4 |
| **Item 10** | 4 | **1.5** | 4 | 3 | 4 | 4 | 4 |
| **Item 11** | 4 | 3 | 4 | 3 | 4 | 4 | 4 |
| **Item 12** | 3 | 4 | 4 | **2** | 4 | 3 | 4 |
| **Item 13** | 4 | **2** | 4 | 4 | 3 | 3 | 3 |
| **# items meeting criterion** | 12 | 10 | 11 | 11 | 11 | 13 | 13 |

*Note.* Items are identified by subscale number only, i.e., Item 1 SEG refers to the first item of the SEG subscale. Numbers in bold type represent values below 2.75 which is the lower limit of the relevance criterion.

Table 9

*Content Validity Coefficients ($VI_k$) For Each Item*

| | Subscale | | | | | | |
|---|---|---|---|---|---|---|---|
| **Item** | **SEG**[a] | **EP**[a] | **SE**[a] | **EO**[b] | **ATES**[b] | **ED**[b] | **ETMPE**[b] |
| **Item 1** | .650 | .972* | .700* | .750* | .750* | .722* | .778* |
| **Item 2** | .825* | .917* | .750* | .611 | .972* | .944* | .694 |
| **Item 3** | .825* | .972* | .900* | .694 | .389 | .861* | .806* |
| **Item 4** | .425 | .778* | .550 | .833* | .500 | 1.000* | .833* |
| **Item 5** | .700* | .044 | .225 | .556 | .639 | .750* | .694 |
| **Item 6** | .600 | .556 | .800* | .722* | .750* | .833* | .611 |
| **Item 7** | .975* | 1.000* | .738* | .527 | .583 | .889* | .722* |
| **Item 8** | .850* | .778* | .700* | .972* | .694 | .667 | .667 |
| **Item 9** | .950* | .611 | 1.000* | .833* | .556 | .861* | .806* |
| **Item 10** | .875* | .361 | .975* | .639 | .833* | .861* | .778* |
| **Item 11** | .725* | .583 | .700* | .556 | .833* | .889* | .861* |
| **Item 12** | .575 | .944* | .750* | .472 | .889* | .639 | .917* |
| **Item 13** | .775* | .639 | .750* | .806* | .639 | .667 | .806* |
| **# significant items** | 9 | 7 | 11 | 6 | 6 | 10 | 9 |

*Note.* Items are identified by subscale number only, i.e., Item 1 SEG refers to the first item of the SEG subscale. [a] Indicates that 10 judges rated each of the items in this subscale. [b] Indicates that 9 judges rated each of the items in this subscale (removal of judge 9). *$p$<.05.

*Item relevance summary*. Taking into consideration the modified $R_k$ criteria ($R_k >$ 3 with 1 or 2 outlying values), 49 items were classified as relevant. These relevant items were distributed across the seven subscales as shown in Table 10. The subscales with items presenting the fewest potential problems were Setting Exercise Goals (SEG), Prioritization of Exercise (EP), and Awareness of Time and Exercise Suitability (ATES).

Table 10

*Items Meeting the Revised Criteria Through Calculation of $R_k$, $Md_k$, and $VI_k$.*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ |
|---|---|---|---|---|
| SEG k = 8 | | | | |
| 2-10 | My exercise goals are unrealistic. | 3 | 3 | .825* |
| 3-13 | I periodically evaluate my exercise goals to see if they need changing. | $4^b$ | 4 | .825* |
| 7-44 | I set short term exercise goals for what I want to accomplish each week. | 2 | 4 | .975* |
| 8-49 | I don't have long term exercise goals. | 2 | 3 | .850* |
| 10-62 | I have short term exercise goals. | 2 | 4 | .950* |
| 10-65 | I have seasonal exercise goals. | 3 | 4 | .875* |
| 11-72 | I set challenging exercise goals for myself. | 2 | 4 | .725* |
| 13-84 | I revise my exercise goals when needed. | $4^b$ | 4 | .775* |
| EP k = 7 | | | | |
| 1-3 | Exercise is not a priority in my life. | 2 | 4 | .875* |
| 2-6 | Finding the time to exercise is not important to me. | 2 | 4 | .825* |
| 3-11 | Exercise is an important part of my life. | 2 | 4 | .950* |
| 4-18 | I have clear exercise priorities. | $4^b$ | 4 | .700* |
| 7-40 | Exercise is among my top priorities. | 1 | 4 | 1.000* |
| 8-48 | I include exercise activities in my list of priorities for each day. | 3 | 4 | .800* |
| 12-70 | I include exercise when I develop a priority list. | $4^b$ | 4 | .875* |
| SE k = 6 | | | | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | $5^a$ | 3.5 | .900* |
| 6-35 | I have a weekly exercise schedule. | $5^a$ | 4 | .800* |
| 9-59 | I schedule my exercise activities at least one week in advance. | 1 | 4 | 1.00* |
| 10-66 | I set aside a specified amount of time each day for exercise. | 2 | 4 | .975* |
| 11-75 | I have a monthly exercise schedule. | $5^a$ | 4 | .700* |
| 12-82 | I do not schedule time for exercise. | 2 | 4 | .750* |
| EO k = 5 | | | | |
| 1-1 | Because I am disorganized, I lack the time to exercise. | 3 | 3 | .997* |
| 4-31 | I conserve time throughout the day in order to have time for exercise. | $4^b$ | 4 | .833* |
| 8-60 | I prepare the things I need for my exercise activities ahead of time. | 2 | 4 | .972* |
| 9-64 | I look for ways to increase the efficiency with which I perform my exercise activities. | $4^b$ | 4 | .833* |
| 13-87 | I have an exercise routine. | $4^b$ | 4 | .806* |

Table 10

*Items Meeting the Revised Criteria Through Calculation of $R_k$, $Md_k$, and $VI_k$.*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ |
|---|---|---|---|---|
| ATES k = 6 | | | | |
| 1-2 | Even when I am pressured for time, I still manage to exercise. | 3 | 3 | .750* |
| 2-8 | I accurately estimate the amount of time it takes me to exercise. | 2 | 4 | .972* |
| 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | 3 | 3 | .750* |
| 10-63 | My exercise activities and the time I have for exercise are compatible. | $4^b$ | 4 | .833* |
| 11-68 | I underestimate the time it will take to complete my exercise activities. | $4^b$ | 4 | .833* |
| 12-79 | I select exercise activities I have time for. | 2 | 4 | .889* |
| ED k = 9 | | | | |
| 2-12 | I keep a progress record of my exercise activities. | 3 | 4 | .944* |
| 3-17 | I monitor the amount of exercise I do. | 3 | 4 | .861* |
| 4-23 | I record the amount of time I spend exercising on a day-timer or in a calendar. | 1 | 4 | 1.000* |
| 5-36 | My exercise schedule is written down. | $5^a$ | 3 | .750* |
| 6-45 | I use a day-timer to block out time for exercise. | $5^a$ | 4 | .833* |
| 7-52 | I keep an exercise diary, log, or workbook. | $5^a$ | 4 | .889* |
| 9-73 | I record my exercise sessions on a calendar. | $4^b$ | 4 | .861* |
| 10-77 | I check exercise off of my to do list as soon as I finish exercising. | $4^b$ | 4 | .861* |
| 11-83 | I document my exercise activities. | 3 | 4 | .889* |
| SE k = 6 | | | | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | $5^a$ | 3.5 | .900* |
| 6-35 | I have a weekly exercise schedule. | $5^a$ | 4 | .800* |
| 9-59 | I schedule my exercise activities at least one week in advance. | 1 | 4 | 1.00* |
| 10-66 | I set aside a specified amount of time each day for exercise. | 2 | 4 | .975* |
| 11-75 | I have a monthly exercise schedule. | $5^a$ | 4 | .700* |
| 12-82 | I do not schedule time for exercise. | 2 | 4 | .750* |
| ETMPE k = 8 | | | | |
| 1-7 | I do not like to schedule my exercise activities. | 3 | 3 | .778* |
| 3-21 | I feel guilty when I am unable to exercise. | $5^a$ | 4 | .806* |
| 4-32 | I feel stressed when I do not find the time to exercise. | $5^a$ | 4 | .833* |
| 9-61 | I get upset when I miss my exercise activities. | $5^a$ | 4 | .806* |
| 10-69 | I know the type of exercise activities I prefer. | $4^b$ | 4 | .778* |
| 11-81 | I like to exercise at the same time each day. | $4^b$ | 4 | .861* |
| 12-88 | I know the time of day when I prefer to exercise. | 2 | 4 | .917* |
| 13-90 | I like to schedule my exercise activities for the same time each day. | $4^b$ | 4 | .806* |

*Note.* Items are identified by subscale number and overall number, i.e., SEG 2-10 refers to the second SEG item and is the 10th item of the TIMES. [a] indicates high $R$ values due to outlying score(s) of a "0". [b] indicates high $R$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

*Item representativeness.* To assess item representativeness, the panel members indicated how many of the items fit each of the subscale specifications with a rating of 3 (*good fit*) or 4 (*excellent fit*). The number of relevant items for each subscale, according to each judge, is presented in Table 11. As indicated previously, a minimum of 8 items was desired for each of the subscales. Of the nine panelists who judged all seven of the subscales, five panel members indicated that all subscales were adequately represented (as characterized by at least 8 items that were judged as *excellent fit* or *good fit*). For these panelists, the number of relevant items for each of the subscales ranged from 8 to 13.

Table 11

*Judges' Analysis of Item Representativeness*

| | Number of Relevant Items per Subscale | | | | | | |
|---|---|---|---|---|---|---|---|
| **Judges** | **SEG** | **EP** | **SE** | **EO** | **ATES** | **ED** | **ETMPE** |
| **Judge 1** | 11 | 12 | 12 | 12 | 13 | 13 | 9 |
| **Judge 2** | 10 | 8 | 11 | 6 | 12 | 13 | 13 |
| **Judge 3** | 7 | 7 | 6 | 4 | 4 | 5 | 5 |
| **Judge 4** | 8 | 4 | 4 | 5 | 8 | 10 | 8 |
| **Judge 5** | 13 | 12 | 11 | 11 | 9 | 12 | 12 |
| **Judge 6** | 9 | 5 | 6 | 9 | 7 | 7 | 12 |
| **Judge 7** | 12 | 12 | 10 | 11 | 12 | 13 | 13 |
| **Judge 8** | 11 | 10 | 9 | 9 | 9 | 11 | 12 |
| **Judge 9** | 9 | 8 | 10 | **N/A** | **N/A** | **N/A** | **N/A** |
| **Judge 10** | 12 | 12 | 12 | 12 | 11 | 8 | 13 |
| **Min** | 7 | 4 | 4 | 4 | 4 | 5 | 5 |
| **Max** | 13 | 12 | 12 | 12 | 13 | 13 | 13 |

*Note.* Subscales are presented in this table. N/A indicates a not applicable scoring (Judge 9 was removed from further analysis for these subscales). Min. indicates minimum number of representative items. Max. indicates maximum number of representative items.

Judge 9, who rated only three of the subscales, indicated that all three subscales were adequately represented with the number of relevant items ranging from 8 to 10. For the remaining four panel members, the number of adequately represented subscales ranged from 0 (judge 3) to 6 (judge 2) while the number of relevant items for each of the subscales ranged from 4 to 13.

*Item representativeness summary.* Panel members varied in the number of subscales they rated as being adequately (at least 8 items per subscale) represented. According to the panel members, the subscale Setting Exercise Goals received the most support for item representativeness. All but one panel member identified at least 8 representative items for this subscale with the number of representative items ranging from 8 to 13 items. Judge 3, who did not recognize any of the subscales as adequately represented, identified 7 representative items for the Setting Exercise Goals subscale. The majority of the judges indicated that all subscales possessed evidence of item representativeness.

### *Results of Open Ended Feedback*

*Item clarity and readability.* Item clarity and readability comments are summarized for each subscale in Table 12. Half of the panel members indicated that the items were clear and free of irrelevant material. All panelists believed that the reading level of the items was appropriate for undergraduate university students and for people who wanted to initiate, maintain, or increase their exercise program. At the item level, no items were flagged by more than three of the panelists as being unclear or difficult to read. One judge suggested that the negative wording of some of the items may be difficult or challenging for participants to interpret and another judge commented that participants would require a grade 9 reading level to complete the TIMES.

Table 12

*Frequency Table Of Judges' Comments Regarding Item Clarity*

| *Judge* | *Q1* | *Q2* | *Q3* | *Q4* | *Comments* |
|---|---|---|---|---|---|
| *Judge 1* | YES | YES | N/A | YES | *N/A* |
| *Judge 2* | NO | YES | N/A | YES | *Categories very broad, general items.* |
| *Judge 3* | YES | YES | N/A | N/A | *N/A* |
| *Judge 4* | YES | YES | N/A | N/A | *N/A* |
| *Judge 5* | NO | YES | YES | YES | Reduce definition overlap |
| *Judge 6* | YES | YES | YES | NO | Reverse worded items difficult to interpret |
| *Judge 7* | NO | YES | YES | YES | Some items can be deleted; need to be in Grade 9 or higher |
| *Judge 8* | NO | YES | YES | YES | Some irrelevant items |
| *Judge 9* | YES | YES | YES | YES | Simplify Exercise and Time Managements Preferences and Emotions |
| *Judge 10* | NO | YES | YES | YES | Some content is confusing |
| *% of Judges who believe items are readable and clear* | | | | | |
| | *50* | *100* | *100* | *90* | |

*Note.* Q = question; Q1: Do you think that the TIMES items overall are clear and free of any irrelevant material? Q2: Do you have any experience working with, teaching, or supervising undergraduate university students? If YES, is the reading level of these items appropriate for undergraduate students? Q3: Do you have any experience working with, teaching, or counseling people who want to initiate an exercise program? If YES, is the reading level of these items appropriate for people who want to initiate an exercise program? Q4: Do you have any experience working with, teaching or counseling people who want to increase or maintain their exercise program? If YES, is the reading level of these items appropriate for people who want to increase or maintain their exercise program?

The panel members appeared to have more concerns regarding item clarity in the context of item content. For example, six of the judges noted that there was some type of item and category overlap or that some items could be deleted. Item and category overlap was defined by these panelists as items matching more than one subscale category, subscale categories that were too broad, or items that were not specific enough.

Panel members also provided feedback in the form of reasons as to why the items did not fit the specified subscale, proposed which subscale items fit best, suggested item revisions, and recommended item additions. Although all judges provided some type of comment or suggestion, the most useful comments were the item revision and item addition recommendations that included examples of the modified/added items (see Table 13).

Table 13

*Feedback (Item Revision and Addition Recommendations) From Judges*

| Subscale Item | Original Wording/Suggestions | Item Revision/Addition Recommendations |
|---|---|---|
| SEG 2-10 | 1. My exercise goals are unrealistic. (Make items active, change "have" to *set.*) | I *set* realistic exercise goals. |
| SEG 10-62 | I have short term exercise goals. (Make item active, change "have" to *set.*) | I *set* short term exercise goals. |
| SEG 11-65 | I have seasonal exercise goals. (Make item active, change "have" to *set.*) | I *set* seasonal exercise goals. |
| SEG | Add item. | I set goals for my exercise participation and adherence |
| SEG | Add items for each of: goal specificity, goal difficulty, goal flexibility, and goal proximity. | No example. |
| SEG | Add *importance* of goal setting items. | No example. |
| EP 3-11 | Exercise is an important part of my life. | *I make* exercise an important part of my life. |
| SE 7-35 | I have a weekly exercise schedule. | I *set* a weekly exercise schedule *in advance.* |
| SE 11-75 | I have a monthly exercise schedule. | I *set* a monthly exercise schedule *in advance.* |
| SE 13-91 | I schedule exercise activities at least three times per week. | I schedule exercise activities *for myself.* |
| EO 9-64 | I look for ways to increase the efficiency with which I perform my exercise activities. | I perform my exercise *activities very efficiently.* |
| ED 10-77 | I check exercise off of my to lists as soon as I finish exercising. | I check exercise off of my to do lists *when* I finish exercising. |

*Note.* Items are identified by subscale number and overall number, i.e., SEG 2-10 refers to the second SEG item and is the 10th item of the TIMES.

*Results of judges' feedback regarding the number of subscales.* Half of the judges were concerned about the conceptual clarity of the TIMES and indicated that the category definitions should be tightened and made more specific. However, one possible result of more specific category definitions is the development of additional categories. For example, several panel members indicated that the Exercise and Time Management Preferences and Emotions subscale was too broad or multidimensional and should be divided into two subscales: an expanded Exercise and Time Management Emotions subscale and an Exercise and Time Management Preferences subscale. Two panel members suggested additional subscales should be included in the TIMES. For example, one panelist stated that "outcome expectations or rewards for successful time management" should be an additional category. The second panel member suggested that the TIMES was missing social support items that could possibly be added under a revised Exercise Organization subscale or added as a separate subscale. In contrast, four panel members suggested that categories could be combined. For example, three panelists indicated that the Exercise Scheduling and Exercise Organization subscales were highly correlated and, therefore, could be combined.

### *Sample of Students*

To further clarify the readability of the TIMES items and instructions, a sample of students was asked to complete the TIMES, a rating scale to determine the clarity of the items and the instructions, and a demographic questionnaire. A copy of this package is provided in Appendix G. The student sample consisted of two undergraduate university students in the Education program and two graduate students in the Educational

Psychology program at the University of Alberta. The students were recruited informally and their responses were summarized and kept confidential.

*Demographic questionnaire.* Three of the participants were female. Participants ranged in age from 25 to 32 years and all four were full-time students. Hours spent studying ranged from 10 to 25 hours per week. Both graduate students were employed as graduate assistants through the University and thus worked approximately 12 hours per week while the two undergraduate students worked approximately 12 hours and 20 hours per week, respectively. None of the students were engaged in steady volunteer work. All students were experienced with informal time management through books (75.0%) and television shows (50.0%). Half of the students had experienced formal time management training either through the University of Alberta or through their high school.

*Methodology and results of rating scale.* The students answered the following two questions for each of the 91 items:

1. Reading Level: Using a dichotomous scale, “Yes” or “No”, is the reading level of the item appropriate for undergraduate university students?
2. Item Clarity: Using a dichotomous scale, “Yes” or “No”, Is the item clear and free of any irrelevant material?

All four students indicated that the reading level of each item was appropriate for university undergraduate students. Three of the students suggested revisions to four items (see Table 14). For example, one student indicated that ED item 4-23, “I record the amount of time I spend exercising in a day-timer or on a calendar” was too long and could be shortened to, “I record the amount of time I spend exercising.” Similarly, SEG item 7-44 and ED item 10-77 were identified by another student as containing similar extraneous material and a third student indicated that SEG item 3-13 could be shortened to "I periodically evaluate my exercise goals."

Table 14

*Student Suggestions to Improve Item Clarity*

| Subscale Item | Original Wording | Revised Wording |
|---|---|---|
| SEG<br>3-13 | I periodically evaluate my exercise goals to see if they need changing. | I periodically evaluate my exercise goals. |
| SEG<br>7-44 | I set short term exercise goals for what I want to accomplish each week. | I set short term exercise goals. |
| ED<br>4-23 | I record the amount of time I spend exercising in a day-timer or on a calendar. | I record the amount of time I spend exercising. |
| ED<br>10-77 | I check exercise off of my "to do list" as soon as I finish exercising. | I check exercise off of my "to do list" when I finish exercising. |

*Note:* Items are identified by subscale number and overall number, i.e., SEG 3-13 refers to the third SEG item and is the 13th item of the TIMES.

The students were then asked about the readability and clarity of the TIMES instructions. They answered the following three questions:

1. Reading Level: Using a dichotomous scale, "Yes" or "No", is the reading level of the TIMES instructions appropriate for undergraduate level university students?
2. Clarity: Using a dichotomous scale, "Yes" or "No", are the TIMES instructions stated clearly?
3. Clarity: Using a dichotomous scale, "Yes" or "No", are the TIMES instructions free of any irrelevant material?

All four students agreed that the reading level of the TIMES instructions were appropriate for undergraduate university students and that the TIMES instructions were stated clearly and were free of any irrelevant material.

Students were also asked about the clarity of the TIMES response format using the following question, "Using a dichotomous scale, "Yes" or "No", is the response format of the TIMES clear?" Although all students found the response format to be clear, two of the students suggested that problems could arise from the design of the title header which included the labeled response options and empty response boxes (see Figure 3). Changes in design were required to avoid confusion and to prevent erroneously using the title line to respond to the first item, possibly resulting in an increase in missing values.

| TIMES Statements | Does Not Describe Me At All | | | | Describes Me Very Well |
|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ |
| 1. Because I am disorganized, I lack the time to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Even when I am pressured for time, I still manage to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |

*Figure 3.* Example of problem header.

Following this, each student was offered the opportunity to provide additional comments and suggestions. The only comment made was directed to the demographic items and not to the TIMES items themselves. The comment detailed the importance of including full-time parenting as an option under full-time employment.

### *Summary*

Across the assessments of item ratings, two subscales were consistently identified by the panel members as possessing strong evidence of item relevance and item representativeness. These subscales were: Setting Exercise Goals and Prioritization of Exercise. In addition, the subscales Exercise Documentation and Awareness of Time and Exercise Suitability received moderate support. These results were further supported by feedback from the panel members: Of the three remaining subscales, several panelists believed that the content of the Exercise Organization and Scheduling Exercise subscales overlapped and should be combined and that the Exercise and Time Management Preferences and Emotions subscale should be divided into two separate subscale categories.

The results of the student sample feedback regarding the clarity of the TIMES items and instructions were positive and supported the feedback provided by the expert panel members. The student sample also identified a potential problem with the design of the TIMES questionnaire. However, it was impossible to include any revisions to the TIMES package prior to conducting the initial empirical field study. A teachers' strike, which affected the community surrounding the University of Alberta during the winter of 2002, also disrupted the initial empirical validation phase. This disruption caused an unexpected change to the data collection timeline. Thus, the 91-items, TIMES instructions, and format of the TIMES and demographic questionnaires initially developed were used for the first empirical field test.

Furthermore, although the judgmental analysis illuminated both the representativeness and relevancy of the items, the design was to combine this information with input from the population of interest, undergraduate students. Therefore, the judgmental analysis results will be re-examined in Chapter 5 and integrated with the results of the initial empirical validation phase before deleting any items or combining and/or creating any new subscales.

# CHAPTER FIVE

## Empirical Validation of the Time Management Exercise Scale

### *Introduction*

The initial empirical validation of the TIMES was disrupted due to a teachers' strike affecting the community surrounding the University of Alberta during the winter of 2002. Consequently, analysis of the expert panel judgments and the initial empirical student data were conducted concurrently instead of sequentially. Thus, the 91 items, TIMES instructions, and format of the TIMES and demographic questionnaires initially developed were used for the first empirical field test.

The purpose of the present chapter is to describe the empirical validation methodology and results. The methodology section consists of descriptions of the data collection procedures, instrumentation, and data analyses. The empirical validation results are presented in the second section and include a detailed description of the field study sample as well as the results of the exploratory factor analysis. Following this, the judgments of the expert panel members are reexamined in light of the results of the field study and integrated with the results from the factor analysis. The section concludes with the item analyses of the resulting TIMES items. The final section of the chapter consists of a description of the characteristics of the TIMES subscales.

### *Empirical Validation Methodology*

#### *Data Collection*

The purpose of the initial field study was to provide empirical validity evidence for the TIMES. Professors of two sections of a required third year undergraduate class in the Faculty of Education and one undergraduate class in the Faculty of Physical Education and Recreation at the University of Alberta were asked to participate. Thus, 704 university students were approached across the three undergraduate classes. A sample of this size ensures stable reliability estimates and the capacity to conduct factor analysis (Tabachnick & Fidell, 1996).

The study was introduced to the professors in January of 2002. The students responded to the TIMES in class during the month of March 2002. For each of the participating sections, the researcher provided an introduction and an explanation of the study and requested student participation. Participation in the study was voluntary. Students were asked to provide their consent to participate and were required to sign an informed consent form attached to the front of the TIMES. Once consent had been obtained, students were asked to complete the TIMES and the background questionnaire.

### *Instrumentation*

*The Time Management Exercise Scale (TIMES).* The TIMES was developed to measure time management skills and behaviors relevant to exercise adoption, participation, and adherence. The first draft of the TIMES was composed of 13 items for each of seven subscales resulting in a total of 91 items. Participants were asked to indicate how well each item described their current behavior using a five-point Likert-type response format ranging from 0 (*does not describe me at all*) to 4 (*describes me very well*). The polarity of 34 of the items was reversed.

*The background questionnaire.* The background questionnaire was designed to collect demographic, time management, and exercise information. The demographic information collected included gender, age, part-time or full-time student status, program of study, and current hours of employment. Information was also collected on previous formal and informal time management experiences, preferred exercise context, current exercise behavior, and the following theory of planned behavior variables: (a) intention to exercise, (b) exercise motives, (c) exercise barriers, and (d) perceived control over time for exercise. An assessment of the sample's time management and exercise behaviors was deemed necessary in order to delineate the characteristics and the composition of the empirical sample. Furthermore, it was anticipated that positive relationships would exist between the subscales of the TIMES and time management experience and the subscales of the TIMES and exercise behavior. In addition, it was anticipated that participants with more intentions, motives, and perceived control over time to exercise would score higher on the subscales of the TIMES. Conversely, participants with fewer barriers to exercise were expected to score higher on the TIMES subscales.

Current exercise behavior was assessed using Godin's Leisure Time Exercise Questionnaire (GLTEQ: Godin, Shephard, & Colantonio, 1986; Godin & Shepard, 1985). The GLTEQ provides a generalized view of activity levels over a seven-day period. The GLTEQ consists of frequency items for mild, moderate, and strenuous intensity exercise. Using the GLTEQ, it was also possible to calculate an overall exercise Leisure Score Index (LSI) by weighting each exercise frequency by exercise intensity and summing for a total score using the formula LSI = 3 X mild + 5 X moderate + 9 X strenuous (Godin et al.,1986; Godin & Shepard, 1985). The GLTEQ was developed and validated with an adult population and an independent evaluation of the GLTEQ found it to be easily administered, brief, reliable, and to possess concurrent validity based on various criteria including objective activity monitors and fitness indices (Jacobs, Ainsworth, Hartman, & Leon, 1993).

Intention to exercise was assessed using four separate items modified from Courneya (1994). The items were: (a) "I intend to exercise regularly (at least 3 times per week) during the next 4 months" with responses ranging from 1 (*strongly disagree*) to 7 (*strongly agree*), (b) "I intend to exercise at least ___ times per week during the next 4 months, (c) "I intend to exercise with the following regularity during the next 4 months" anchored by 1 (*not at all*) to 7 (*every day*), and (d) "I intend to exercise at least 3 times per week over the next 4 months" with responses ranging from 1 (*definitely*) to 7 (*definitely not*).

In order to assess exercise motives, participants were provided with the following question, "How important are each of the following reasons in your decision to exercise?" followed by five potential exercise motives: (a) fitness and health, (b) physical appearance, (c) weight control, (d) meeting people/socializing, and (e) mental health and stress relief. Participants responded using a 5-point scale ranging from 1 (*minor importance*) to 5 (*major importance*).

Exercise barriers were assessed using the question, "How much of a barrier is each of the following items to you exercising regularly?" followed by five potential exercise barriers: (a) lack of time/too busy, (b) lack of energy/too tired, (c) lack of motivation/desire (d) excessive cost/too expensive, and (e) lack of convenient facilities. Participants responded using a 5-point scale ranging from 1 (*minor barrier*) to 5 (*major barrier*).

Perceived control over time for exercise was assessed using the 3 items suggested by Ajzen and Madden (1986) but modified to reflect perceived control over time for exercise. Participants responded to the following items: (a) "How much control do you have over your time for exercise over the next 4 months?" anchored by 1 (*very little control*) and 7 (*complete control*), (b) "For me, finding the time to exercise regularly for the next 4 months would be" with responses ranging from of 1 (*extremely easy*) to 7 (*extremely difficult*), and (c) "If I wanted to, I could easily find the time to exercise regularly over the next 4 months" anchored by 1 (*strongly disagree*) and 7 (*strongly agree*). It was estimated that approximately 15 to 20 minutes would be needed to complete the introduction, the self-administered TIMES, and the background questionnaire. A copy of the 91-item TIMES is found in Appendix E and a copy of the informed consent form and the background questionnaire is located in Appendix H.

### *Analyses of Empirical Validation Data*

*Data entry and integrity.* Data were entered into the SPSS 10.0 computer program during March and April of 2002 with 100% verification. One experienced individual performed the data entry twice according to a standardized coding scheme. The two files were then compared using the SPSS 10.0 computer program. All differences that existed between the two files were then inspected and corrected.

*Missing item-level data.* In order to avoid missing data, all participants were encouraged to answer each and every item. Missing background questionnaire data was managed using pairwise case deletion. When missing data was discovered for a participant in the calculation of a TIMES subscale, the mean score based on the respondent's scores on the remaining subscale items was calculated and then imputed (Spielberger, 1983) for the participant.

*Statistical analyses of the TIMES data.* The statistical analyses of the TIMES data involved five analyses. First, in order to examine the nature of the sample and to identify potential differences among sub-groups of the sample, frequency distributions, correlations, and measures of central tendency and variability were examined for all demographic, time management experience, exercise, and theory of planned behavior items. Second, exploratory factor analysis (Gorsuch, 1983) of the TIMES was conducted in order to identify and interpret the number of latent factors. Third, based on the results of the factor analysis, the judgmental analysis presented in Chapter 4 was reexamined. Fourth, in order to examine the homogeneity and quality of the items, item and scale analyses were conducted to determine the number of items required per subscale while maintaining a minimal internal consistency value of 0.70 (Nunnally & Bernstein, 1994), and preferably an internal consistency value of 0.80 or above (Rogers, 2000). Although Gorsuch (2003) proposed four to six items per subscale as the optimum number of items for factor analysis, items chosen for the final instrument were selected to maximize internal consistency without losing content relevance or representativeness (Cronbach, 1971). Thus, a minimum of 8 items per subdomain was sought. Fifth, the characteristics of the TIMES subscales were examined including subscale means and standard deviations as well as the relationships between the TIMES subscales and the TIMES subscales with other demographic variables. A significance level of .05 was utilized for all tests.

## *Empirical Validation Results*

### *Sample Characteristics*

*Description of sample.* The response rate was 72.4% and participation was voluntary. The sample consisted of 510 Canadian undergraduate University of Alberta students from two sections of a required class ($n_1 = 118$; $n_2 = 191$) in the Faculty of Education and one section of a first year class ($n_3 = 201$) in the Faculty of Physical Education and Recreation.

A MANOVA was conducted in order to test whether the TIMES data from the three samples could be collapsed into one large sample. Box's M test of equality of covariance matrices showed a statistically significant ($p < .01$) result despite a small test value ($F = 1.33$). This result was most likely caused by the enormous degrees of freedom ($df_1 = 8{,}372$, $df_2 = 265{,}300$) involved in the calculation of the $F$ value. Thus, the results showed that the data from the three samples could safely be collapsed into one sample for further analysis.

The majority of the participants were female (69.7%), had never been married (82.3%), and were registered as full time students (98.2%). Participants ranged in age from 18 to 57 years with a mean age of 24.0 years ($SD = 5.6$). In addition, the majority of the participants were working on their first university degree (74.2%), with the minority having already completed a university degree (22.2%). Hours spent studying ranged from zero to more than 40 hours per week with approximately half (50.5%) of the students studying more than ten hours per week. Older students also tended to study more ($r = .16$; $p < .05$).

Approximately 58% of the participants were engaged in paid employment but only 17.6% were working more than 20 hours per week. A further 37.3% of the participants performed unpaid volunteer work with the majority (73.8%) volunteering between one and five hours per week. In addition, hours of paid employment was significantly related to hours of volunteer work ($r = .23$; $p < .05$) indicating that as the hours of paid employment increased so did the hours of volunteer work.

*Time management experience.* Participants were also asked about their previous formal and informal time management experiences. Formal time management experiences were defined as attending workshops or classes offered by the University of Alberta, off-site, or by their employer and 28.7% of the participants responded that they had formal time management training. Of the participants with formal time management training, 37.7% had attended University of Alberta workshops, 37.7% had attended a time management workshop off-campus, 29.5% had attended a time management class offered by their employer, and 21.9% had attended some other type of formal time management training workshop.

Informal time management experiences were characterized by reading books or by watching TV programs or videos. Only 19.5% of the participants indicated that they had experienced informal time management training. Of those participants with informal time management experience, 56.7% had read books, 45.5% had watched TV programs, 29.2% had watched videos, and 17.2% had experienced informal time management through some other method.

As expected, formal and informal time management experiences were significantly related ($r = .34$; $p < .05$) indicating that the more experienced participants were with formal time management, the more experienced they were with informal time management. Age was significantly but weakly related to formal time management training ($r = .12$; $p < .05$) and informal time management training ($r = .12$; $p < .05$) indicating that as participants increased in age, their familiarity with time management also increased.

*Exercise behavior.* The mean total exercise metabolic equivalents (METS) per week for this sample was close to 50 METS (see Table 15). One MET is defined as the energy used by the body at rest such as while sitting quietly reading a book (McArdle, Katch, & Katch, 1991). Since a 70 kg person expends an average of 28 METS per week performing a moderate activity such as walking for 1 hour per day, 7 days per week (Moses, 2000), this result indicates an active sample of participants.

Table 15

*Exercise Activity (METS per week)*

| Activity Level | Minimum METS | Maximum METS | Mean METS | *SD* |
|---|---|---|---|---|
| Strenuous | 0 | 225 | 22.5 | 22.1 |
| Moderate | 0 | 150 | 15.2 | 14.6 |
| Mild | 0 | 135 | 12.1 | 13.8 |
| Total (LSI) | 0 | 510 | 49.8 | 42.5 |

Furthermore, only 3.8% of the sample indicated that they did not participate in any amount of exercise activity. With respect to preferred exercise intensity, 3.2% of participants preferred mild exercise, 52.2% preferred moderate exercise, 40.7% preferred strenuous exercise, and 4.0% preferred a combination of exercise intensities. Age was significant but weakly related to the amount of strenuous ($r = -.10$; $p < .05$) and mild ($r = -.13$; $p < .05$) exercise performed indicating that older participants reported less strenuous and mild exercise sessions.

The majority of participants preferred exercising with a friend or a partner (51.2%) over exercising alone (31.8%), in a group (13.5%), or with a few people (3.5%).

With respect to preferred exercise location, the majority of participants preferred exercising at a fitness club (38.1%), followed by outdoors (29.1%), at the specific location of their activity (e.g., ice rink, gymnasium; 16.3%), and home (15.9%).

Of all listed activities, participants seemed to prefer weight training (52.9%), team sports (48.4%), walking (47.6%), jogging (42.9%), and biking (42.0%) the most (see Table 16). Participants also appeared to favor unsupervised (59.0%) and recreational exercise activities (52.4%) over spontaneous (38.4%), competitive (36.7%), scheduled (33.9%), or coached/instructed (33.5%) exercise activities.

Table 16

*Preferred Exercise Activity*

| Exercise Activity | *N* Preferred | % Preferred |
|---|---|---|
| Weight Training | 270 | 52.9 |
| Team Sport | 247 | 48.4 |
| Walking | 243 | 47.6 |
| Jogging | 219 | 42.9 |
| Biking | 214 | 42.0 |
| Skating/Roller Blading | 171 | 33.5 |
| Aerobics | 163 | 32.0 |
| Swimming | 157 | 30.8 |
| Individual Sport | 91 | 17.8 |
| Pair Sport | 67 | 13.1 |
| Body Building | 38 | 7.5 |

*Theory of Planned Behavior variables.* The four intention to exercise items were transformed into z-scores and then summed to provide the intention scale score (Courneya, 1995). The reliability of the resulting intention scale was good ($\hat{\alpha} = 0.87$). The mean intention score was 3.7 ($SD = 0.8$) showing that on average, participants had a moderate level of exercise intentions. The higher the participants' intention to exercise, the more total ($r = .43$; $p < .05$), strenuous ($r = .47$; $p < .05$), and moderate ($r = .23$; $p < .05$) exercise they performed.

The responses to the five exercise motive items were summed to create an exercise motives scale (Courneya, 1995). The coefficient alpha for these items was poor ($\hat{\alpha} = .49$) with scores ranging from 5 to 25. The mean score on the exercise motives scale was 19.1 ($SD = 3.1$) indicating that on average, participants considered the five motives to be important reasons to exercise. Similar to intention, the more motivated the participant was to exercise, the more total ($r = .13$; $p < .05$), strenuous ($r = .14$; $p < .05$) and moderate ($r = .10$; $p < .05$) exercise was performed. However, these relationships were all very weak and interpretations involving the exercise motives scale should be done with caution due to the poor internal consistency value associated with this scale. The majority of participants considered fitness and health (64.9%) and physical appearance (45.8%) as major motivating reasons to exercise. In contrast, less than 10% of the participants considered socializing to be a major motivating reason to exercise (see Table 17).

Table 17

*Exercise Motives by Percentage*

| | Minor | | Moderate | | Major |
|---|---|---|---|---|---|
| Exercise Motives | | | Importance | | |
| | 1 | 2 | 3 | 4 | 5 |
| Fitness and Health | 0.8 | 1.0 | 6.6 | 26.7 | 64.9 |
| Physical Appearance | 1.8 | 3.8 | 12.9 | 35.7 | 45.8 |
| Weight Control | 8.2 | 7.0 | 12.6 | 32.3 | 39.9 |
| Socializing | 26.0 | 25.4 | 19.9 | 19.1 | 9.7 |
| Stress Relief | 5.8 | 5.8 | 17.8 | 32.9 | 37.7 |

Similar to the exercise motives scale, the five exercise barrier items were summed (Courneya, 1995). The coefficient alpha for the exercise barrier scale was marginal ($\hat{\alpha} = 0.67$) with scores ranging from 5 to 24. The mean score on the exercise barrier scale was 13.5 (*SD* = 4.2) indicating that on average, participants considered these five barriers to be of moderate importance. For example, for the majority (49.2%) of participants, excessive cost was only a minor barrier to exercise participation. In comparison, lack of time for exercise was considered a major barrier to exercise by 27.7% and as a moderate or greater barrier by 77.7% of participants (see Table 18). Lack of time for exercise was also significantly related to intention to exercise ($r = -.25$; $p < .05$) and control over time for exercise ($r = -.47$; $p < .05$). This indicates that the more importance participants placed in lack of time as an exercise barrier, the less they intended to exercise and the less control they believed they had in their time to exercise. In contrast to exercise intentions and motives, participants who placed less importance on the exercise barriers performed more total ($r = -.31$; $p < .05$), strenuous ($r = -.33$; $p < .05$), and moderate ($r = -.17$; $p < .05$) exercise.

Table 18

*Exercise Barriers by Percentage*

| | Minor | | Moderate | | Major |
|---|---|---|---|---|---|
| | | | Importance | | |
| Exercise Barriers | 1 | 2 | 3 | 4 | 5 |
| Lack of time | 12.2 | 10.2 | 25.9 | 24.1 | 27.7 |
| Lack of energy | 158 | 21.0 | 22.4 | 26.5 | 14.2 |
| Lack of motivation | 21.8 | 21.6 | 20.8 | 20.8 | 15.2 |
| Excessive cost | 49.2 | 19.9 | 15.3 | 10.4 | 5.2 |
| Lack of convenient facilities | 43.3 | 21.5 | 19.3 | 9.9 | 6.0 |

Scores on each of the three perceived control over time for exercise items were summed to create the perceived control over exercise scale. The reliability of this scale was good ($\hat{\alpha} = 0.81$) and scores ranged from 3 to 21 with a mean score of 15.2 (*SD* = 3.7). These results indicate that on average, the majority of participants believed they had a moderate to large degree of control over their ability to manage their time for exercise. Participants scoring higher on the perceived control over time scale participated in significantly more total ($r = .28$; $p < .05$), strenuous ($r = .32$; $p < .05$), and moderate ($r = .13$; $p < .05$) exercise.

Furthermore, in accordance with the theory of planned behavior (Ajzen, 1991), there were significant relationships among the variables that constitute the theory. At the

.05 level of significance, intention to exercise was significantly related to control over time for exercise ($r = .43$), barriers to exercise ($r = -.40$), and exercise motives ($r = .36$). Control over time for exercise was also significantly related to exercise motives ($r = .15$; $p < .05$). This indicates that participants who placed less emphasis on exercise barriers or who were more motivated to exercise had stronger intentions to exercise. Participants with stronger motivations to exercise also felt more in control over their time for exercise and in turn, participants who felt more in control over their time for exercise intended to exercise more.

### *Exploratory Factor Analysis Methodology and Results*

Despite the iterative nature of exploratory factor analysis, the exploratory factor analysis methodology is presented in a consecutive manner beginning with the extraction procedures followed by the rotation/transformation procedures.

*Factor extraction.* Various researchers believe that selection of the correct number of factors is one of the most difficult decisions that must be made during factor analysis (Tabachnick & Fidell, 1996). According to Gorsuch (1983, p.123), "The general conclusion is that when the number of variables is moderately large, for example, greater than 30, and the analysis contains virtually no variables expected to have low communalities (e.g., .4), practically any of the exploratory procedures other than diagonal or multi-group analysis will lead to the same interpretations." Although this factor analytic study involved a large number of variables (i.e., 91 items), the communalities of the items were unknown. Thus, three "rules" to determine the initial number of factors were employed and the results examined for consensus and convergence (Hakstein, Rogers, & Cattell, 1982). The final determination was influenced by the interpretability of the factor pattern derived from the rotation/transformation of the unrotated pattern matrix corresponding to each of the number of factors retained for consideration. Given that principal components extraction is the most widely utilized method of factor extraction (Gorsuch, 1983), the first two rules are based on the results of this extraction: (a) Kaiser-Guttman rule of retaining factors with eigenvalues greater or equal to 1.0 (Kaiser, 1960), and (b) Cattell's (1966) Scree plot criteria. Principal components of the TIMES item data revealed that there were 18 possible factors, while Cattell's Scree plot criteria identified 3 factors (see Figure 4).

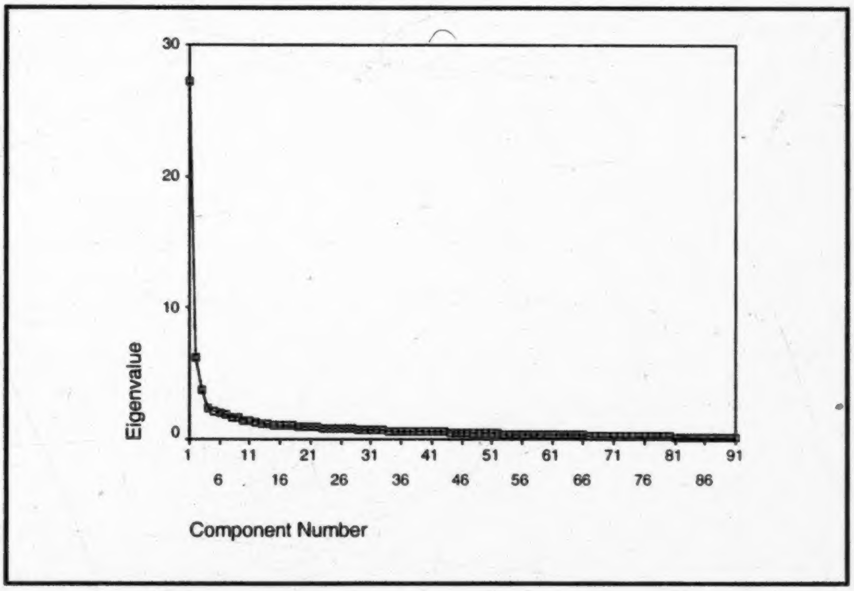

*Figure 4.* Scree plot identifying 3 factors (First empirical field test).

The third rule involved an image extraction followed by varimax rotation of all of the image components (Kaiser, 1962; 1963). Kaiser pointed out that the number of factors was equal to the number of the first common factor (at least a doublet) encountered when working back from the last image component. Following this, Kaiser's procedure yielded 9 factors. Thus, the number of factors identified by the three procedures ranged from 3 to

18. According to Hackstian et al. (1982), when the sample size is large (> 250 people) and the average communalities are 0.60 or larger, both the Scree (Cattell, 1966) and the Kaiser-Guttman rule (Kaiser, 1960) should yield credible results. However, when the commonalities are low, and the ratio of major factors to variables is also low, the Kaiser-Guttman rule (Kaiser, 1960) tends to over identify factors (Hackstein et al., 1982). Consequently, subsequent factor rotations and transformations were conducted for 3 through 9 factors inclusive.

*Factor rotations and transformations.* Factor rotations and transformations were conducted and both orthogonal and oblique solutions were examined. The domains were hypothesized to be equally important, therefore, orthogonal solutions were obtained by conducting a principal axis analysis followed by varimax rotation and then a principal axis analysis followed by equamax rotation (Gorsuch, 1983). Second, oblique solutions were obtained by conducting a principal axis analysis followed by a direct oblimin transformation (Carroll, 1957) with delta set equal to 0, - 0.5, -1, -2 and –3.

The move from principal components to a principal axis extraction method was made due to the indeterminate nature of the common factor model. Principal components analysis does not require communality estimates and thus was used for initial factor extraction. However, once the number of factors are extracted and identified, the communalites can then be estimated using the principal axis procedure followed by the respective rotation and /or transformation procedures. This is advantageous because the principal axis procedure produces more conservative loadings than the principal components analysis (Gorsuch, 1983) which is appropriate in the scale construction context when the purpose is to select the best fitting items.

Factor interpretations were based on the identification of factor patterns that best met the criteria of simple structure (Thurstone, 1947) and where the factor pattern coefficients were of sufficient magnitude "to assume that a relationship exists between the variable and the factor" (Gorsuch, 1983, p. 208). According to Gorsuch (1983), only rough guidelines can be provided to determine salient loadings. Among the methods of determining the lower bound, is the criterion of meaningfulness. Following Gorsuch (1983), the absolute value of 0.30 was used as the minimum loading for interpretation in these analyses. Once factor patterns portraying simple structure and salient loadings were obtained, the factor patterns were then assessed for a substantively meaningful solution.

*Initial selection of best-fitting solutions.* According to the guidelines of parsimony, simple structure, and salient loadings, it quickly became clear that factor rotations/transformations of 3 or 4 extracted factors provided the best results. Based on the guidelines, the three best fitting solutions were: a) Principal axis extraction for 3 factors followed by varimax rotation; b) Principal axis extraction for 3 factors followed by oblimin transformation with delta set equal to zero; and c) Principal axis extraction for 4 factors followed by oblimin transformation with delta set equal to zero.

Comparisons among the three solutions were conducted (see Table 19).

Table 19

*Comparisons Among the Three Best Fitting Solutions*

| Solution | # items <.30 | # of Singlets | # of Doublets | | | # of Triplets | | | Distribution of Items Across Factors[a] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | # | <.35 | <.40 | # | <.35 | <.40 | 1 | 2 | 3 | 4 | T |
| 1 | 7 | 47 | 29 | 10 | 21 | 8 | 5<br>1 S<br>4 D | 8<br>1 S<br>7 D | 49 | 20 | 15 | N/A | 84 |
| 2 | 7 | 71 | 12 | 6 | 12 | 1 | 1<br>1 S | N/A | 59 | 15 | 10 | N/A | 84 |
| 3 | 14 | 55 | 22 | 17 | 20 | 0 | N/A | N/A | 25 | 15 | 23 | 14 | 77 |

*Note.* Solution 1 (principal axis followed by varimax rotation), 3 factors. Solution 2 (principal axis followed by direct oblimin ($\Delta=0$), 3 factors. Solution 3 (principal axis followed by direct oblimin ($\Delta=0$), 4 factors. S indicates singlet. D indicates doublet. T indicates total number of items across factors. [a] indicates distribution of items across factors after discounting the minimum factor loadings (items with factor loadings less than .30) for the doublets and triplets.

The principal axis extraction for 3 factors followed by varimax rotation provided results with seven items that had all factor loadings below the $|0.30|$ criterion (Gorsuch, 1983), 47 singlets, 29 doublets, and eight triplets. After including only the higher factor loadings for the doublets and triplets (i.e., with items that load on two or more factors, one item the *high* item, has a higher loading than the other(s), the *low* item(s)), 49 items loaded on Factor 1, 20 items loaded on Factor 2, and 15 items loaded on Factor 3. The principal axis extraction for 3 factors followed by oblimin transformation with delta set equal to zero provided results with seven items that had all pattern coefficients below the $|0.30|$ criterion, 71 singlets, 12 doublets, and one triplet. After including only the higher pattern coefficients for both the doublets and the triplets (i.e., with items that load on two or more factors, one item the *high* item, has a higher absolute coefficient than the other(s), the *low* item(s)), 59 items loaded on Factor 1, 15 items loaded on Factor 2, and 10 items loaded on Factor 3. In comparison, the principal axis extraction for 4 factors followed by oblimin transformation with delta set equal to zero provided results with 14 pattern coefficients below the $|0.30|$ criterion, 55 singlets, 22 doublets, and no triplets. After including only the higher pattern coefficients for the doublets, 25 items loaded on Factor 1, 15 items loaded on Factor 2, 23 items loaded on Factor 3, and 14 items loaded on Factor 4.

Since factor patterns portraying simple structure and salient loadings were obtained, these three factor patterns were assessed for the most substantively meaningful solution. In order to identify a substantively meaningful solution, each factor pattern was re-examined by re-running the factor analysis after deleting the items that originally fell below the minimum loading criterion value of $|0.30|$.

After removing the seven items that did not originally load for the first factor pattern and re-running the factor analysis on the remaining 84 items, results showed zero factor loadings below $|0.30|$, 50 singlets, 29 doublets, and five triplets. In comparison, after removing the seven items which did not load on the initial transformation of the second factor pattern and re-running the factor analysis, results showed one pattern coefficient below $|0.30|$, 71 singlets, and 12 doublets. After removing the 14 items that did not load on the initial transformation of the third factor pattern and re-running the factor analysis on the remaining 77 items, results showed no pattern coefficients below $|0.30|$, 62 singlets, and 15 doublets. Due to the complexity of factor pattern one as demonstrated by the number of triplets ($n = 5$) and doublets ($n = 29$) as compared to either pattern two (12 doublets) or three (15 doublets), factor pattern one, the principal axis extraction followed by varimax rotation for 3 factors, was eliminated as a potential solution.

*Comparison of factor patterns two and three.* Comparisons between the principal axis followed by direct oblimin 3 and 4 factor solutions were conducted and are presented in Table 20.

Table 20

*Comparisons Among the PA followed by Direct Oblimin 3 and 4 Factor Solutions*

| Solution | # of Items Initially Removed | # items <.30 | # of Singlets | # of Doublets | | | Distribution of Items Across Factors[a] | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | # | # <.35 | # <.40 | 1 | 2 | 3 | 4 | T |
| 3 Factors | 7 | 1 | 71 | 12 | 4 | 9 | 51 | 15 | 17 | N/A | 83 |
| 4 Factors | 14 | 0 | 61 | 16 | 12 | 14 | 29 | 15 | 19 | 14 | 77 |

*Note.* 3 Factors indicates Solution 2 (principal axis followed by direct oblimin (Δ=0). 4 Factors indicates Solution 3 (principal axis followed by direct oblimin (Δ=0). T indicates total number of items across all factors. N/A indicates not applicable. [a] indicates distribution of items across factors after discounting the minimum factor loadings for the doublets (items with factor loadings less than 0.40).

Although 12 doublets remained following the re-running of the factor analysis on factor pattern two, four of the doublets (33.3%) had minimum pattern coefficient values of 0.35 or less and nine (75.0%) had minimum pattern coefficient values of 0.40 or less. After discounting the minimum pattern coefficients (items with pattern coefficient values less than 0.40) for the doublets, 51 items loaded on Factor 1, 15 items loaded on Factor 2, and 17 items loaded on Factor 3. Of the items loading on Factor 1, the majority of the items were originally written for the ETMPE (23.5%), EP (19.6%), SEG (17.6%), and SE (15.7%) subscales. Of the items loading on Factor 2, the majority of the items were written for the ED subscale (73.3%). Similarly, of the items loading on Factor 3, the majority (41.1%) were ATES items. The correlations between the factors ranged from -.13 to .40.

In comparison, 16 doublets remained after re-running the factor analysis on factor pattern three. However, 12 of the doublets (80.0%) had minimum pattern coefficient values of 0.35 or less and 14 of the doublets (87.5%) had minimum pattern coefficient values of 0.40 or less. After discounting the minimum pattern coefficient values (items with pattern coefficient values less than 0.40) for the doublets, 29 items loaded on Factor 1, 15 items loaded on Factor 2, 19 items loaded on Factor 3, and 14 items loaded on Factor 4. Of the items loading on Factor 1, the majority of the items were originally written for the EP (27.6%), ETMPE (20.7%), or SE (20.7%) subscales. Of the items loading on Factor 2, the majority (73.3%) of the items were written for the ED subscale. Similarly, of the items loading on Factor 3, the majority (42.1%) were ATES items. Of the items loading on Factor 4, the majority (64.3%) were items from the SEG subscale. The correlations between the factors ranged from -.11 to .52.

After comparing the factor patterns of both solutions, factor pattern three, the principal axis extraction for 4 factors followed by oblimin transformation with delta set equal to zero, presented the best fitting solution for two reasons. First, although factor pattern three had a higher percentage of doublets than pattern two, a higher percentage of the minimum values of the doublets in pattern three were smaller in absolute value (below.35) and thus barely exceeded the criterion of meaningfulness. Second, factor pattern three distributed the pattern coefficient values more equally across the factors as compared to pattern two. Although Factor 2 appeared to be essentially the same factor for both solutions (consisting primarily of ED items), Factor 1 in pattern two seemed to be a compilation of Factor 1 and Factor 4 from pattern three. Thus, factor pattern three provided the best example of simple structure, the most substantively meaningful solution, and provided the most discrimination between the factors. The complete factor analysis results of factor pattern three, principal axis followed by direct oblimin (Δ = 0) for 4 factors, is presented in Table 21.

Table 21

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation (Δ =0)*

| **#** | **Item** | **Item Description** | **Factor** | | | |
|---|---|---|---|---|---|---|
| | | | **1** | **2** | **3** | **4** |
| 1 | O 1-1 | Because I am disorganized I lack the time for exercise. | | | **.496** | |
| 2 | ATES 1-2 | Even when I am pressured for time, I still manage to exercise. | .402 | | -.373 | |
| 3 | EP 1-3 | Exercise is not a priority in my life. | **-.489** | | | |
| 4 | SEG 1-5 | I keep my long-term exercise goals in mind when I think about exercise. | .314 | | | .413 |
| 5 | EP 2-6 | Finding the time to exercise is not important to me. | **-.607** | | | |
| 6 | ETMPE 1-7 | I do not like to schedule my exercise activities. | **-.458** | | | |
| 7 | ATES 2-8 | I accurately estimate the amount of time it takes me to exercise. | **.411** | | | |
| 8 | ED 1-9 | I write notes to remind myself to exercise. | | .435 | .306 | |
| 9 | SEG 2-10 | My exercise goals are unrealistic. | | | **.414** | |
| 10 | EP 3-11 | Exercise is an important part of my life. | **.676** | | | |
| 11 | ED 2-12 | I keep a progress record of my exercise activities. | | **.613** | | |
| 12 | SEG 3-13 | I periodically evaluate my exercise goals to see if they need changing. | | | | **.575** |
| 13 | SE 2-15 | I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time. | | | **.516** | |
| 14 | ATES 3-16 | I put off exercise. | -.315 | | .510 | |

Table 21 continued

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation ($\Delta$ =0)*

| # | Item | Item Description | Factor | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 15 | ED 3-17 | I monitor the amount of exercise I do. | | | | **.441** |
| 16 | EP 4-18 | I have clear exercise priorities. | .344 | | | .451 |
| 17 | SEG 4-19 | I use exercise to help me reach other health related goals. | .409 | | | .315 |
| 18 | EO 2-20 | I am unwilling to reorganize my time to include exercise. | **-.419** | | | |
| 19 | ETMPE 3-21 | I feel guilty when I am unable to exercise. | **.525** | | | |
| 20 | SE 3-22 | I reserve time in my daily schedule for exercise activities. | .517 | | -.366 | |
| 21 | ED 4-23 | I record the amount of time I spend exercising in a day-timer or on a calendar. | | **.785** | | |
| 22 | EP 5-24 | I make sure that I exercise regularly. | .548 | | -.438 | |
| 23 | ATES 4-25 | I turn down offers to participate in exercise activities because I have no time. | | | **.515** | |
| 24 | EO 3- 26 | I organize my exercise activities. | **.423** | | | |
| 25 | SE 4-27 | It is a waste of time to try and schedule my day to include exercise. | **-.471** | | | |
| 26 | EP 6-28 | I have weekly exercise priorities. | .331 | | | .340 |
| 27 | SE 5-30 | I exercise consistently. | .449 | | -.490 | |
| 28 | EO 4-31 | I conserve time throughout the day in order to have time for exercise. | .448 | | -.313 | |
| 29 | ETMPE 4-32 | I feel stressed when I do not find the time for exercise. | **.672** | | | |
| 30 | ATES 5-33 | I have difficulty finishing exercise activities once I have started them. | **-.337** | | | |
| 31 | EO 5-34 | I am often late for my exercise activities. | | | **.475** | |
| 32 | SE 6-35 | I have a weekly exercise schedule. | | **.307** | | |
| 33 | ED 5-36 | My exercise schedule is written down. | | **.717** | | |

Table 21 continued

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation (Δ =0)*

| **#** | **Item** | **Item Description** | **Factor** | | | |
|---|---|---|---|---|---|---|
| | | | **1** | **2** | **3** | **4** |
| 34 | SEG 6-37 | My exercise goals are unclear. | | | | **-.462** |
| 35 | EO 6-38 | My exercise routine is inefficient. | | | **.441** | |
| 36 | EP 7-40 | Exercise is among my top priorities. | **.551** | | | |
| 37 | ATES 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | | | **.542** | |
| 38 | SE 7-43 | Most of the time I exercise at the spur of the moment. | -.353 | | .344 | |
| 39 | SEG 7-44 | I set short term exercise goals for what I want to accomplish each week. | | | | **.640** |
| 40 | ED 6-45 | I use a day-timer to block out time for exercise. | | **.700** | | |
| 41 | ATES7-47 | I often miss-out on my exercise activities because I am over-committed. | | | **.674** | |
| 42 | EP 8-48 | I include exercise activities in my list of priorities for each day. | **.401** | | | |
| 43 | SEG 8-49 | I don't have long term exercise goals. | | | | **-.476** |
| 44 | SE 8-50 | My exercise schedule is irregular. | | | **.558** | |
| 45 | ATES 8-51 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | | | **.483** | |
| 46 | ED 7-52 | I keep an exercise diary, log, or workbook. | | **.758** | | |
| 47 | EP 9-54 | I have monthly exercise priorities. | | | | **.696** |
| 48 | EP 10-56 | I'm not serious enough in accomplishing my exercise goals. | | | **.465** | |
| 49 | ATES 9-57 | My life is so full that I can't imagine finding time for exercise. | | | **.489** | |
| 50 | ED 8-58 | I write my exercise goals down. | | **.666** | | |
| 51 | SE 9-59 | I schedule my exercise activities at least one week in advance. | | **.391** | | |
| 52 | ETMPE 9-61 | I get upset when I miss my exercise activities. | **.693** | | | |

Table 21 continued

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation ($\Delta$ =0)*

| # | Item | Item Description | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|---|---|
| 53 | SEG 9-62 | I have short term exercise goals. | | | | **.732** |
| 54 | ATES 10-63 | My exercise activities and the time I have for exercise are compatible. | | | -.367 | .300 |
| 55 | EO 9-64 | I look for ways to increase the efficiency with which I perform my exercise activities. | | | | **.466** |
| 56 | SEG 10-65 | I have seasonal exercise goals. | | | | **.552** |
| 57 | SE 10-66 | I set aside a specified amount of time each day for exercise. | .367 | | -.314 | |
| 58 | EP 11-67 | I do not value exercise. | **-.587** | | | |
| 59 | ATES 11-68 | I underestimate the time it will take to complete my exercise activities. | | | **.401** | |
| 60 | ETMPE 10-69 | I know the type of exercise I prefer. | **.354** | | | |
| 61 | EP 12-70 | I include exercise when I develop a priority list. | .410 | .306 | | |
| 62 | EO 10-71 | I often waste my exercise time. | | | **.453** | |
| 63 | SEG 11-72 | I set challenging exercise goals for myself. | | | | **.547** |
| 64 | ED 9-73 | I record my exercise sessions on a calendar. | | **.796** | | |
| 65 | SE 11-75 | I have a monthly exercise schedule. | | .479 | | .337 |
| 66 | ED 10-77 | I check exercise off my "to do list" as soon as I finish exercising. | | **.627** | | |
| 67 | EP 13-78 | I do not know how to prioritize my activities so that I include exercise. | | | **.469** | |
| 68 | ATES 12-79 | I select exercise activities that I have time for. | **.389** | | | |
| 69 | SE 12-82 | I do not schedule time for exercise. | **-.385** | | | |
| 70 | ED 11-83 | I document my exercise activities. | | **.817** | | |
| 71 | SEG 13-84 | I revise my exercise goals when needed. | | | | **.570** |
| 72 | ATES 13-85 | I spend too much time exercising. | | **.315** | | |
| 73 | ED 12-86 | I check my "to do lists" frequently so I do not forget to exercise. | | **.588** | | |
| 74 | EO 13-87 | I have an exercise routine. | **.450** | | | |
| 75 | ETMPE 12-88 | I know the time of day when I prefer to exercise. | **.391** | | | |

Table 21 continued

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation ($\Delta$ =0)*

| **#** | **Item** | **Item Description** | **Factor** | | | |
|---|---|---|---|---|---|---|
| | | | **1** | **2** | **3** | **4** |
| 76 | ED 13-89 | I often forget to include exercise when I make lists of things to do. | | | **.481** | |
| 77 | SE 13-91 | I schedule exercise activities at least three times per week. | **.486** | | | |

*Note.* Items are identified by subscale number and overall number, i.e., SEG 2-10 refers to the second SEG item and is the 10th item of the TIMES. Values in bold indicate singlets. Pattern coefficients <0.295 are deleted.

### *Judgmental Analysis Revisited*

The best fitting solution, the principal axis extraction for four factors followed by oblimin transformation with delta set equal to zero, was based on 77 items after the removal of 14 items (items SE 1-4, ETMPE 2-14, SEG 5-29, ETMPE 5-39, ETMPE 6-42, ETMPE 7-46, EO 7-53, ETMPE 8-55, EO 8-60, EO 11-74, EO 12-76, SEG 12-80, ETMPE 11-81, and ETMPE 13-90). Of the 14 items removed, 11 of the items (78.6%) (SE 1-4, ETMPE 2-14, SEG 5-29, ETMPE 5-39, ETMPE 6-42, ETMPE 7-46, EO 7-53, ETMPE 8-55, EO 11-74, EO 12-76, and SEG 12-80,) also did not meet the judgmental criteria through the calculation of $R_k$, $Md_k$, and $VI_k$. Only three items were eliminated due to the factor analysis that met the judges' criteria (items EO 8-60, ETMPE 11-81, and ETMPE 13-90) (see Table 22).

Table 22

*Items Eliminated From Factor Analysis Despite Meeting Judges Criteria*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Range of Factor Loadings |
|---|---|---|---|---|---|
| EO<br>8-60 | I prepare the things I need for my exercise activities ahead of time. | 2 | 4 | .972* | -.105 to .270 |
| ETMPE<br>11-81 | I like to exercise at the same time each day. | $4^a$ | 4 | .778* | .003 to .219 |
| ETMPE<br>13-90 | I like to schedule my exercise activities for the same time each day. | $4^a$ | 4 | .806* | .008 to .278 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EO 8-60 refers to the eighth EO item and is the 60th item of the TIMES. [a] indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

*Re-examination of judgmental analysis in context of factor analysis.* Table 23 presents the factor analysis location of the items meeting the judgmental criteria. As stated in Chapter 4, the panel members indicated that 49 of the 91 items met the judgmental criteria through the calculation of $R_k$, $Md_k$, and $VI_k$ and were classified as relevant. Of these 49 items, 46 items fit the factor pattern. A further 31 items that fit the factor pattern did not meet the judgmental criteria.

Table 23

*Location on the Factor Analysis of Items Meeting the Judgmental Criteria*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor |
|---|---|---|---|---|---|
| SEG k=8 | | | | | |
| 2-10 | My exercise goals are unrealistic. | 3 | 3 | .825* | 3 |
| 3-13 | I periodically evaluate my exercise goals to see if they need changing. | 4[b] | 4 | .825* | 4 |
| 7-44 | I set short term exercise goals for what I want to accomplish each week. | 2 | 4 | .975* | 4 |
| 8-49 | I don't have long term exercise goals. | 2 | 3 | .850* | 4 |
| 9-62 | I have short term exercise goals. | 2 | 4 | .950* | 4 |
| 10-65 | I have seasonal exercise goals. | 3 | 4 | .875* | 4 |
| 11-72 | I set challenging exercise goals for myself. | 2 | 4 | .725* | 4 |
| 13-84 | I revise my exercise goals when needed. | 4[b] | 4 | .775* | 4 |
| EP k=7 | | | | | |
| 1-3 | Exercise is not a priority in my life. | 2 | 4 | .875* | 1 |
| 2-6 | Finding the time to exercise is not important to me. | 2 | 4 | .825* | 1 |
| 3-11 | Exercise is an important part of my life. | 2 | 4 | .950* | 1 |
| 4-18 | I have clear exercise priorities. | 4[b] | 4 | .700* | 4 |
| 7-40 | Exercise is among my top priorities. | 1 | 4 | 1.000* | 1 |
| 8-48 | I include exercise activities in my list of priorities for each day. | 3 | 4 | .800* | 1 |
| 12-70 | I include exercise when I develop a priority list. | 4[b] | 4 | .875* | 1 |
| SE k=6 | | | | | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | 5[a] | 3.5 | .900* | 1 |
| 6-35 | I have a weekly exercise schedule. | 5[a] | 4 | .800* | 2 |
| 9-59 | I schedule my exercise activities at least one week in advance. | 1 | 4 | 1.00* | 2 |
| 10-66 | I set aside a specified amount of time each day for exercise. | 2 | 4 | .975* | 1 |
| 11-75 | I have a monthly exercise schedule. | 5[a] | 4 | .700* | 2 |
| 12-82 | I do not schedule time for exercise. | 2 | 4 | .750* | 1 |
| EO k=5 | | | | | |
| 1-1 | Because I am disorganized, I lack the time to exercise. | 3 | 3 | .997* | 3 |
| 4-31 | I conserve time throughout the day in order to have time for exercise. | 4[b] | 4 | .833* | 1 |
| **8-60** | **I prepare the things I need for my exercise activities ahead of time.** | **2** | **4** | **.972*** | **R** |
| 9-64 | I look for ways to increase the efficiency with which I perform my exercise activities. | 4[b] | 4 | .833* | 4 |
| 13-87 | I have an exercise routine. | 4[b] | 4 | .806* | 1 |

Table 23 continued

*Location on the Factor Analysis of Items Meeting the Judgmental Criteria*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor |
|---|---|---|---|---|---|
| ATES k=6 | | | | | |
| 1-2 | Even when I am pressured for time, I still manage to exercise. | 3 | 3 | .750* | 1 |
| 2-8 | I accurately estimate the amount of time it takes me to exercise. | 2 | 4 | .972* | 1 |
| 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | 3 | 3 | .750* | 3 |
| 10-63 | My exercise activities and the time I have for exercise are compatible. | $4^b$ | 4 | .833* | 3 |
| 11-68 | I underestimate the time it will take to complete my exercise activities. | $4^b$ | 4 | .833* | 3 |
| 12-79 | I select exercise activities I have time for. | 2 | 4 | .889* | 1 |
| ED k=9 | | | | | |
| 2-12 | I keep a progress record of my exercise activities. | 3 | 4 | .944* | 2 |
| 3-17 | I monitor the amount of exercise I do. | 3 | 4 | .861* | 4 |
| 4-23 | I record the amount of time I spend exercising on a day-timer or in a calendar. | 1 | 4 | 1.000* | 2 |
| 5-36 | My exercise schedule is written down. | $5^a$ | 3 | .750* | 2 |
| 6-45 | I use a day-timer to block out time for exercise. | $5^a$ | 4 | .833* | 2 |
| 7-52 | I keep an exercise diary, log, or workbook. | $5^a$ | 4 | .889* | 2 |
| 9-73 | I record my exercise sessions on a calendar. | $4^b$ | 4 | .861* | 2 |
| 10-77 | I check exercise off of my to do list as soon as I finish exercising. | $4^b$ | 4 | .861* | 2 |
| 11-83 | I document my exercise activities. | 3 | 4 | .889* | 2 |
| ETMPE k=8 | | | | | |
| 1-7 | I do not like to schedule my exercise activities. | 3 | 3 | .778* | 1 |
| 3-21 | I feel guilty when I am unable to exercise. | $5^a$ | 4 | .806* | 1 |
| 4-32 | I feel stressed when I do not find the time to exercise. | $5^a$ | 4 | .833* | 1 |
| 9-61 | I get upset when I miss my exercise activities. | $5^a$ | 4 | .806* | 1 |
| 10-69 | I know the type of exercise activities I prefer. | $4^b$ | 4 | .778* | 1 |
| **11-81** | **I like to exercise at the same time each day.** | $4^b$ | **4** | **.861*** | **R** |
| 12-88 | I know the time of day when I prefer to exercise. | 2 | 4 | .917* | 1 |
| **13-90** | **I like to schedule my exercise activities for the same time each day.** | $4^b$ | **4** | **.806*** | **R** |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., SEG 2-10 refers to the second SEG item and is the 10th item of the TIMES. Items in bold indicate items which did not load on the initial factor analysis and thus were removed. **R** indicates removed item. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". $^b$ indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

*Panel members' ratings of the items fitting factor 1.* The items fitting Factor 1 are presented in Table 24.

Table 24

*Items Fitting Factor 1 According to Factor Analysis (k=77)*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| **EP** | | | | | |
| 1-3 | Exercise is not a priority in my life. | 2 | 4 | .875* | -.489 |
| 2-6 | Finding the time to exercise is not important to me. | 2 | 4 | .825* | -.607 |
| 3-11 | Exercise is an important part of my life. | 2 | 4 | .950* | .676 |
| **5-24** | **I make sure that I exercise regularly.** | **5** | **2.5** | **.044** | **.548** |
| 7-40 | Exercise is among my top priorities. | 1 | 4 | 1.000* | .551 |
| 8-48 | I include exercise activities in my list of priorities for each day. | 3 | 4 | .800* | .401 |
| **11-67** | **I do not value exercise.** | **5** | **3** | **.583** | **-.587** |
| 12-70 | I include exercise when I develop a priority list. | 4[b] | 4 | .875* | .410 |
| **SE** | | | | | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | 5[a] | 3.5 | .900* | .517 |
| **4-27** | **It is a waste of time to try to schedule my day to include exercise.** | **4** | **2.5** | **.550** | **-.471** |
| **7-43** | **Most of the time I exercise at the spur of the moment.** | **4** | **3** | **.738*** | **-.353** |
| 10-66 | I set aside a specified amount of time each day for exercise. | 2 | 4 | .975* | .367 |
| 12-82 | I do not schedule time for exercise. | 2 | 4 | .750* | -.385 |
| **13-91** | **I schedule exercise activities at least three times per week.** | **4** | **4** | **.750*** | **.486** |
| **ETMPE** | | | | | |
| 1-7 | I do not like to schedule my exercise activities. | 3 | 3 | .778* | -.458 |
| 3-21 | I feel guilty when I am unable to exercise. | 5[a] | 4 | .806* | .525 |
| 4-32 | I feel stressed when I do not find the time to exercise. | 5[a] | 4 | .833* | .672 |
| 9-61 | I get upset when I miss my exercise activities. | 5[a] | 4 | .806* | .693 |
| 10-69 | I know the type of exercise activities I prefer. | 4[b] | 4 | .778* | .354 |
| 12-88 | I know the time of day when I prefer to exercise. | 2 | 4 | .917* | .391 |
| **ATES** | | | | | |
| 1-2 | Even when I am pressured for time, I still manage to exercise. | 3 | 3 | .750* | .402 |
| 2-8 | I accurately estimate the amount of time it takes me to exercise. | 2 | 4 | .972* | .411 |
| **5-33** | **I have difficulty finishing exercise activities once I have started them.** | **5** | **3** | **.639** | -.337 |
| 12-79 | I select exercise activities I have time for. | 2 | 4 | .889* | .389 |

Table 24 continued

*Items Fitting Factor 1 According to Factor Analysis (k=77)*

| Subscale | Item | $R_k$ | $Md_k$ | $V_{Ik}$ | Factor Loading |
|---|---|---|---|---|---|
| EO | | | | | |
| **2-20** | **I am unwilling to reorganize my time to include exercise.** | **5** | **3** | **.611** | **-.419** |
| **3-26** | **I organize my exercise activities.** | **4** | **3** | **.694** | **.423** |
| 4-31 | I conserve time throughout the day in order to have time for exercise. | $4^b$ | 4 | .833* | .448 |
| 13-87 | I have an exercise routine. | $4^b$ | 4 | .806* | .450 |
| SEG | | | | | |
| **4-19** | **I use exercise to help me reach other health related goals.** | **4** | **1.5** | **.425** | **.409** |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EP 1-3 refers to the first EP item and is the 3rd item of the TIMES. Bold items are items fitting the factor analysis but not meeting the judgmental criteria. $^a$ indicates high *R* values due to outlying score(s) of a "0". $^b$ indicates high *R* values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

Although 34 items loaded on Factor 1, five of these items (SEG 1-5, ATES 3-16, EP 4-18, EP 6-28, and SE 5-30) also loaded with higher pattern coefficient values on another factor. Thus, these items were removed from Factor 1 and examined with respect to the factor with the higher pattern coefficient value. Another eight items (ATES 1-2, SEG 4-19, SE 3-22, EP 5-24, EO 4-31, SE 7-43, SE 10-66, and EP 12-70) loaded on a second factor with lower pattern coefficient values and were thus examined with Factor 1. The majority of the items constituting Factor 1 were originally written for the EP (27.6%; 1-3, 2-6, 3-11, 5-24, 7-40, 8-48, 11-67, and 12-70), ETMPE (20.7%; 1-7, 3-21, 4-32, 9-61, 10-69, and 12-88), and SE (20.7%; 3-22, 4-27, 7-43, 10-66, 12-82, and 13-91) subscales.

Of the eight items originally hypothesized to fit EP, only items 5-24 and 11-67 did not meet the judgmental criteria. All of the six items hypothesized to fit ETMPE also met the judgmental criteria. Three of the six items written for SE (3-22, 10-66, and 12-

82) met the judgmental criteria while three did not (4-27, 7-43, and 13-91). Three of the four items loading on Factor 1 that were originally hypothesized to fit the ATES subscale (1-2, 2-8 and 12-79) met the judgmental criteria while item 5-33 did not. Two of the four items hypothesized to fit EO (4-31 and 13-87) met the judgmental criteria while items 2-20 and 3-26 did not. The only SEG item (4-19) to fit Factor 1 also loaded on Factor 4. In addition item SEG 4-19 did not meet the judgmental criteria and was considered a "poor" item by the panel members as it referred to other health behaviors. No ED items fit Factor 1.

*Summary of the items removed from Factor 1.* Ten items were eliminated from Factor 1. Of the eliminated items, five items were moved to another factor due to higher pattern coefficient values on the alternate factor (with or without meeting the judgmental criteria). Another three items were moved due to their double loading on a second factor despite their higher factor loading on Factor 1 because of lack of substantive fit.

More specifically, one ATES and two SE items were removed. The ATES item (1-2) double loaded on Factors 1 and 3 with a higher pattern coefficient value on Factor 1. Thus, it made more substantive sense to retain the item with Factor 3. Similarly, two SE items (7-43, which did not meet the judgmental criteria and 10-66 which did meet the criteria) double loaded on Factor 1 and 3. However, both of these items fit Factor 3 substantively better and were analyzed with the other Factor 3 items. Two additional items were eliminated because they did not meet the judgmental criteria and double loaded on a secondary factor. Specifically, one EP item (5-24) and one SEG item (4-19) did not meet the judgmental criteria and loaded on two factors. Overall, ten items were removed from Factor 1 and 24 items were retained.

*Panel members' ratings of items fitting factor 2.* The items fitting Factor 2 are presented in Table 25.

Table 25

*Items Fitting Factor 2 According to Factor Analysis (k=77)*

| Subscale | | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|---|
| ED | | | | | | |
| | **1-9** | **I write notes to remind myself to exercise.** | **5** | **4** | **.722*** | **.435** |
| | 2-12 | I keep a progress record of my exercise activities. | 3 | 4 | .944* | .613 |
| | 4-23 | I record the amount of time I spend exercising on a day-timer or in a calendar. | 1 | 4 | 1.000* | .785 |
| | 5-36 | My exercise schedule is written down. | $5^a$ | 3 | .750* | .717 |
| | 6-45 | I use a day-timer to block out time for exercise. | $5^a$ | 4 | .833* | .700 |
| | 7-52 | I keep an exercise diary, log, or workbook. | $5^a$ | 4 | .889* | .758 |
| | **8-58** | **I write my exercise goals down.** | **5** | **3** | **.667** | **.666** |
| | 9-73 | I record my exercise sessions on a calendar. | $4^b$ | 4 | .861* | .796 |
| | 10-77 | I check exercise off of my to do list as soon as I finish exercising. | $4^b$ | 4 | .861* | .627 |
| | 11-83 | I document my exercise activities. | 3 | 4 | .889* | .817 |
| | **12-86** | **I check my exercise to do lists frequently so I do not forget to exercise.** | **5** | **3** | **.639** | **.588** |
| SE | | | | | | |
| | 6-35 | I have a weekly exercise schedule. | $5^a$ | 4 | .800* | .307 |
| | 9-59 | I schedule my exercise activities at least one week in advance. | 1 | 4 | 1.00* | .391 |
| | 11-75 | I have a monthly exercise schedule. | $5^a$ | 4 | .700* | .479 |
| ATES | | | | | | |
| **13-85** | | **I spend too much time exercising.** | **4** | **3** | **.639** | **.315** |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., ED 1-9 refers to the first ED item and is the 9th item of the TIMES. Bold items are items fitting the factor analysis but not meeting the judgmental criteria. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". $^b$ indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

Of the 16 items loading on Factor 2, only three items (ED 1-9, EP 12-70, and SE 11-75) loaded on a second factor. For both item ED 1-9 and SE 11-75, the Factor 2 pattern coefficient values were higher, whereas item EP 12-70 had a higher pattern coefficient value for Factor 1 and was therefore examined there. The majority (73.3%) of the items fitting Factor 2 were written for the ED subscale (1-9, 2-12, 4-23, 5-36, 6-45, 7-52, 8-58, 9-73, 10-77, 11-83, and 12-86). Of these 11 items, eight items met the judgmental criteria (2-12, 4-23, 5-36, 6-45, 7-52, 9-73, 10-77, and 11-83). Item 1-9, which did not meet the judgmental criteria also loaded on Factor 3.

All three items hypothesized to fit SE (6-35, 9-59, and 11-75) met the judgmental criteria. However, item 11-75 also loaded, to a lesser degree, on Factor 3. One item (13-85) hypothesized to fit ATES did not meet the judgmental criteria.

*Summary of the items removed from Factor 2.* Of the 16 items loading on Factor 2, one item (EP 12-70) loaded on a second factor to a greater degree and so was examined there. Only one item that was eliminated from the overall factor analysis fit Factor 2 (item ATES 13-85). ATES item 13-85 was eliminated because it did not meet the judgmental criteria. Three SE items (6-35, 9-59, 11-75) and 11 ED (1-9, 2-12, 4-23, 5-36, 6-45, 7-52, 8-58, 9-73, 10-77, 11-83, and 12-86) items were retained for a total of 14 items.

*Panel members' ratings of items fitting factor 3.* The items fitting Factor 3 are presented in Table 26.

Table 26

*Items Fitting Factor 3 According to Factor Analysis (k=77)*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| ATES | | | | | |
| **3-16** | **I put off exercise.** | **4** | **1** | **.389** | **.510** |
| **4-25** | **I turn down offers to participate in exercise activities because I have no time.** | **5** | **2** | **.500** | **.515** |
| 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | 3 | 3 | .750* | .542 |
| **7-47** | **I often miss-out on my exercise activities because I am over-committed.** | **4** | **3** | **.583** | **.674** |
| **8-51** | **When I am very busy, I reallocate the time I set aside for exercise in order to do something else.** | **5** | **3** | **.694** | **.483** |
| **9-57** | **My life is so full, I can't imagine finding time for exercise.** | **5** | **3** | **.556** | **.489** |
| 10-63 | My exercise activities and the time I have for exercise are compatible. | $4^b$ | 4 | .833* | -.367 |
| 11-68 | I underestimate the time it will take to complete my exercise activities. | $4^b$ | 4 | .833* | .401 |
| SE | | | | | |
| **2-15** | **I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time.** | **5** | **3.5** | **.750*** | **.516** |
| **5-30** | **I exercise consistently.** | **5** | **0** | **.225** | **-.490** |
| **8-50** | **My exercise schedule is irregular.** | **5** | **3** | **.639** | **.558** |
| EO | | | | | |
| 1-1 | Because I am disorganized, I lack the time to exercise. | 3 | 3 | .997* | .496 |
| **5-34** | **I am often late for my exercise activities.** | **5** | **2** | **.556** | **.475** |
| **6-38** | **My exercise routine is inefficient.** | **4** | **3** | **.722*** | **.441** |
| **10-71** | **I often waste my exercise time.** | **5** | **3** | **.639** | **.453** |
| EP | | | | | |
| **10-56** | **I'm not serious enough in accomplishing my exercise goals.** | **4** | **1.5** | **.361** | **.465** |
| **13-78** | **I do not know how to prioritize my activities to include exercise.** | **4** | **2** | **.639** | **.469** |
| ED | | | | | |
| **13-89** | **I often forget to include exercise when I make lists of things to do.** | **5** | **3** | **.667** | **.481** |
| SEG | | | | | |
| 2-10 | My exercise goals are unrealistic. | 3 | 3 | .825* | .414 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EP 10-56 refers to the tenth EP item and is the 56th item of the TIMES. Bold items are items fitting the factor analysis but not meeting the judgmental criteria. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". $^b$ indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

Of the 26 items loading on Factor 3, seven items (ATES 1-2, EP 1-9, SE 3-22, EO 4-31, SE 7-43, and SE 10-66) loaded on another factor to a greater degree and were analyzed there. Of the remaining 19 items, three items (ATES 3-16, SE 5-30, and ATES 10-63) loaded on another factor to a lesser degree. The majority (42.1%) of the Factor 3 items (3-16, 4-25, 6-41, 7-47, 8-51, 9-57, 10-63, and 11-68) were originally written for the ATES subscale. Of these eight items, only three met the judgmental criteria (6-41, 10-63, and 611-8). None of the three SE items (2-15, 5-30, and 8-50) fitting Factor 3 met the judgmental criteria. SE item 5-30 also double loaded on Factor 1 and Factor 3. Of the four EO items fitting Factor 3 (1-1, 5-34, 6-38, and 10-71), only one item (1-1) met the judgmental criteria. Although EO item 5-34 did not meet the judgmental criteria, panel members commented that this item belonged with other ATES items. Two EP items (10-56 and 13-78) fit Factor 3 with fairly high factor loadings but both items did not meet the judgmental criteria. One ED item (13-89) and one SE item (2-10) fit Factor 3 and while the SE item met the judgmental criteria, the ED item did not.

*Specific adjustments made to Factor 3.* Although one ATES item (1-2) double loaded on Factors 1 and 3 with a higher loading on Factor 1, it had more in common substantively with Factor 3. Thus ATES item 1-2 was retained with the Factor 3 items. However, three ATES items (3-16, 4-25, and 9-57) did not meet the judgmental criteria and given the low judgmental ratings, these three items were removed from further analysis. Of the eight ATES items, three were removed and one item was added for a total of six retained ATES items.

Two SE items (5-30 and 8-50) were removed from further analysis as they did not meet the judgmental criteria. Although the SE item 2-15 also did not meet the judgmental criteria, it did meet two of the three criteria ($Md_k$ and $VI_k$) and was thus retained. SE items 7-43 and 10-66 double loaded on Factor 1 and Factor 3 but fit substantively with Factor 3. Of the three SE items, two were removed and two were added for a total of three SE items.

Although EP items 10-56 and 13-78 did not meet the judgmental criteria, they were retained because they were substantively similar to other items. Despite the fact that three of the four EO items (5-34, 6-38, and 10-71) did not meet the judgmental criteria, all four items (1-1, 5-34, 6-38, and 10-71) were retained due to moderate factor loadings and substantive fit. For similar reasons, the lone SEG item (2-10) was retained. Despite the factor analysis placing the lone ED item (13-89) with Factor 3, it was eliminated because it did not meet the judgmental criteria and the judges suggested it fit best with Factor 1.

*Summary of the items removed from Factor 3.* Seven items were moved to another factor due to higher pattern coefficient values on the alternate factor (with or without meeting the judgmental criteria). Six items were eliminated from Factor 3 and further factor analysis entirely. Three items were added and thirteen items were retained for a total of sixteen items.

*Panel members' ratings of items fitting factor 4.* Table 27 presents the items fitting Factor 4.

Table 27

*Items Fitting Factor 4 According to Factor Analysis (k=77)*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| **SEG** | | | | | |
| **1-5** | **I keep my long term exercise goals in mind when I think about exercise.** | **5** | **3** | **.650** | **.413** |
| 3-13 | I periodically evaluate my exercise goals to see if they need changing. | $4^b$ | 4 | .825* | .575 |
| **6-37** | **My exercise goals are unclear.** | **5** | **3** | **.600** | **-.462** |
| 7-44 | I set short term exercise goals for what I want to accomplish each week. | 2 | 4 | .975* | .640 |
| 8-49 | I don't have long term exercise goals. | 2 | 3 | .850* | -.476 |
| 10-62 | I have short term exercise goals. | 2 | 4 | .950* | .732 |
| 11-65 | I have seasonal exercise goals. | 3 | 4 | .875* | .552 |
| 12-72 | I set challenging exercise goals for myself. | 2 | 4 | .725* | .547 |
| 13-84 | I revise my exercise goals when needed. | $4^b$ | 4 | .775* | .570 |
| **EP** | | | | | |
| 4-18 | I have clear exercise priorities. | $4^b$ | 4 | .700* | .451 |
| **6-28** | **I have weekly exercise priorities.** | **5** | **3** | **.556** | .340 |
| **9-54** | **I have monthly exercise priorities.** | **5** | **4** | **.611** | .696 |
| **ED** | | | | | |
| 3-17 | I monitor the amount of exercise I do. | 3 | 4 | .861* | .441 |
| **EO** | | | | | |
| 9-64 | I look for ways to increase the efficiency with which I perform my exercise activities. | $4^b$ | 4 | .833* | .466 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., SEG 1-5 refers to the first SEG item and is the 5th item of the TIMES. Bold items are items fitting the factor analysis but not meeting the judgmental criteria. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". $^b$ indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

Of the 17 items loading on Factor 4, three items (SEG 4-19, ATES 10-63, and SE 11-75) loaded on another factor to a greater degree and thus were analyzed there. Another three items (SEG 1-5, EP 4-18, and EP 6-28) loaded to a lesser degree on another factor and were therefore analyzed with Factor 4. In total, 14 items fit Factor 4. The majority (64.3%) of these items were items from the SEG subscale (1-5, 3-13, 6-37, 7-44, 8-49, 10-62, 11-65, 12-72, and 13-84). Seven of these nine SEG items met the judgmental criteria (3-13, 7-44, 8-49, 10-62, 11-65, 12-72, and 13-84). SEG item 1-5 did not meet the judgmental criteria and double loaded on Factor 1. SEG item 6-37 also did not fit the judgmental criteria.

Three items fitting Factor 4 were originally written for EP (4-18, 6-28, and 9-54). Although item 4-18 met the judgmental criteria, items 6-28 and 9-54 did not meet the criteria and also loaded on Factor 1. Item 3-17, originally written for ED, and item 9-64, originally written for EO, fit Factor 4 and met the judgmental criteria.

*Summary of the items removed from Factor 4.* Six items were eliminated from Factor 4. The only SEG item to be eliminated (1-5) did not meet the judgmental criteria and double loaded on Factor 1 and Factor 4. The remaining SEG items were not eliminated. However, five other items were eliminated in part because they did not substantively fit with the remaining SEG items. For example, EP items 4-18 (met the judgmental criteria) and 6-28 (did not meet the judgmental criteria) double loaded on Factors 1 and 4 and were removed from further factor analysis. EP item 9-54, which did not meet the judgmental criteria and ED item 3-17, which met the judgmental criteria, were both eliminated. Similarly, one EO item (9-64) which fit the judgmental criteria was removed from Factor 4 due to substantive differences with the remaining Factor 4 items. Thus, eight SEG items (the minimum number required) were retained.

*Summary of the items removed from the four factors.* Of the items eliminated by the panel of experts, two (item 1-5, and 4-19) were SEG items, two were ED items (items 3-17 and 13-89), four were ATES items (items 3-16, 4-25, 9-57, and 13-85), four were EP items (items 4-18, 5-24, 6-28, and 9-54), two were SE items (items 5-30 and 8-50), and one was an EO item (item 9-64). Thus, a total of 15 items were removed leaving 62 items to be factor analyzed.

*Repeat of factor analysis.* The remaining 62 items were re-factor analyzed (principal axis extraction for four factors followed by oblimin transformation; $\Delta = 0$). The Scree test indicated four factors with eigenvalues of 19.6, 5.5, 3.1, and 1.8, respectively. The factor analysis resulted in zero pattern coefficient values below $|0.30|$, 55 singlets and seven doublets. Of the seven doublets, five had lower factor loadings of 0.35 or less and all had lower factor loadings of 0.40 or less. After deleting the seven items (ATES 12, ED 2-12, EP 10-56, ED 8-58, ATES 10-63, EP 12-70, and EO 10-71) that loaded on more than one factor, 55 items remained. Of these 55 items, 26 items loaded on Factor 1; 11 items loaded on Factor 2; ten items loaded on Factor 3; and eight items loaded on Factor 4. Of the singlet items loading on Factor 1, 26.9% were SE items, 23.1% were EP items, and a further 23.1% were ETMPE items. Ten of the eleven items loading on Factor 2 were ED items and the remaining item was a SE item. Of the items loading on Factor 3, the majority were ATES (40%) or EO (30%) items. All eight items loading on Factor 4 were items belonging to the SEG subscale. The correlations between the factors ranged from -0.04 to 0.50.

Next, the 55-item factor pattern was re-analyzed (principal axis extraction for four factors followed by oblimin transformation; $\Delta = 0$). Once again the Scree test indicated four factors with eigenvalues of 17.1, 4.7, 2.9, and 1.8. Factor analysis results showed the presence of a lone doublet (item SE 7-43). After removing the doublet and re-factor analyzing (principal axis extraction for four factors followed by oblimin transformation; $\Delta = 0$) the resulting 54 items, no doublets were found and pure simple structure (Thurstone, 1947) was obtained. The Scree plot indicated four factors with eigenvalues of 16.7, 4.7, 2.9, and 1.8. According to the analysis, 25 items loaded on Factor 1, 11 items loaded on Factor 2, ten items loaded on Factor 3, and eight items loaded on Factor 4. Correlations between the factors ranged from -.05 to .54.

Although simple structure had been achieved according to the criterion of meaningfulness (Gorsuch, 1983), three of the factors contained more items than required. In order to help reduce the number of items to a more practical number while retaining items with high pattern coefficient values on the factors, it was decided to examine the magnitude of the pattern coefficient values on the three factors. After examining the values, both Factor 1 and 2 contained pattern coefficient values ranging from 0.33 to 0.78. Due to the arbitrary nature of determining the criterion of meaningfulness (Gorsuch, 1983), the *rule of thumb* of only interpreting variables with loadings of 0.32 and above (Tabachnick & Fidell, 2001), and the desire for strong "marker" items, the initial minimum criterion of $|0.30|$ was raised to $|0.50|$. Comrey and Lee (1992) have suggested that loadings of $|0.45|$ can be considered *fair* while loadings of $|0.55|$ can be considered *good*. Thus, the move of the criterion of meaningfulness from $|0.30|$ to $|0.50|$ ensured that all items incorporated into Factors 1 and 2 were at least *fair*. Items with pattern coefficient values of less than $|0.50|$ were then removed from Factors 1 and 2.

Using this criterion, ten items were removed from Factor 1 resulting in 15 items and three items were removed from Factor 2 resulting in the minimum of 8 items for Factor 2. As the range of factor loadings for Factor 3 was much narrower, ranging from 0.41 to 0.66, Factor 3 was not held to the same criteria. Factor 4, already containing the minimum of 8 items, remained untouched. Thus, 41 of the 54 items remained, eliminating 13 items with pattern coefficient values less than 0.50 across Factors 1 and 2.

The 41 remaining items were factor analyzed again (principal axis extraction for four factors followed by oblimin transformation ($\Delta$=0) and no further doublets appeared. The Scree plot identified four factors accounting for 52.3% of the variance. In order to reduce the number of items on Factor 1 and 3 to eight, the judgmental analysis and comments made by panel members were re-examined.

*Judgmental analysis revisited for k=41: Factor 1.* The 15 items fitting Factor 1 are presented in Table 28 along with their $R_k$, $Md_k$, and $VI_k$ ratings as well as their respective factor loadings.

Table 28

*Items Fitting Factor 1 (k=41)*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| **EP** | | | | | |
| 1-3 | Exercise is not a priority in my life. | 2 | 4 | .875* | -.580 |
| 2-6 | Finding the time to exercise is not important to me. | 2 | 4 | .825* | -.628 |
| 3-11 | Exercise is an important part of my life. | 2 | 4 | .950* | .738 |
| 7-40 | Exercise is among my top priorities. | 1 | 4 | 1.000* | .658 |
| **11-67** | **I do not value exercise.** | **5** | **3** | **.583** | **-.528** |
| **SE** | | | | | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | $5^a$ | 3.5 | .900* | .637 |
| **4-27** | **It is a waste of time to try to schedule my day to include exercise.** | **4** | **2.5** | **.550** | **-.483** |
| **7-43** | **Most of the time I exercise at the spur of the moment.** | **4** | **3** | **.738*** | **.414** |
| 10-66 | I set aside a specified amount of time each day for exercise. | 2 | 4 | .975* | -.496 |
| **13-91** | **I schedule exercise activities at least three times per week.** | **4** | **4** | **.750*** | **.605** |
| **ETMPE** | | | | | |
| 3-21 | I feel guilty when I am unable to exercise. | $5^a$ | 4 | .806* | .558 |
| 4-32 | I feel stressed when I do not find the time to exercise. | $5^a$ | 4 | .833* | .728 |
| 9-61 | I get upset when I miss my exercise activities. | $5^a$ | 4 | .806* | .746 |
| **EO** | | | | | |
| 4-31 | I conserve time throughout the day in order to have time for exercise. | $4^b$ | 4 | .833* | .609 |
| 13-87 | I have an exercise routine. | $4^b$ | 4 | .806* | .569 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EP 1-3 refers to the first EP item and is the 3rd item of the TIMES. Bold items are items fitting the factor analysis but not meeting the judgmental criteria. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". $^b$ indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

Two items, (SE 7-43 and SE 10-66) that were originally written for SE loaded on both Factor 1 and Factor 3 when $k = 77$, with Factor 1 receiving the higher loading value. However, substantively, both these items seemed to fit Factor 3 better at $k = 77$, and thus were analyzed with Factor 3 despite their higher Factor 1 pattern coefficient values. Following the $k = 62$ factor analysis, these items did not double load and moved to fit firmly with Factor 1. Consequently, these items were eliminated due to the discrepancy between their content and their factor loading location.

Two additional SE items (4-27 and 13-91) that did not meet the judgmental criteria were also eliminated as they seemed substantively similar to SE items 7-43 and 10-66 and different than the remaining Factor 1 items. Two EO items (4-31 and 13-87) were also removed because they were substantively different from the remaining items despite both fitting the judgmental criteria. In addition, item 13-87 referred to an exercise *routine* whereas the remaining items referred to exercise or exercise activities. Despite meeting the judgmental criteria, the ETMPE item 3-21 (I feel guilty when I am unable to exercise) was eliminated due to potential content irrelevance as it does not reflect a specific issue with time. Thus, seven items were eliminated from Factor 1 resulting in the minimum of 8 items for this subscale. Of these eight items, seven met the judgmental criteria (see Table 29).

Table 29

*Final Eight Items Fitting Factor 1*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| **EP** | | | | | |
| 1-3 | Exercise is not a priority in my life. | 2 | 4 | .875* | -.580 |
| 2-6 | Finding the time to exercise is not important to me. | 2 | 4 | .825* | -.628 |
| 3-11 | Exercise is an important part of my life. | 2 | 4 | .950* | .738 |
| 7-40 | Exercise is among my top priorities. | 1 | 4 | 1.000* | .658 |
| **11-67** | **I do not value exercise.** | **5** | **3** | **.583** | **-.528** |
| **SE** | | | | | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | $5^a$ | 3.5 | .900* | .637 |
| **ETMPE** | | | | | |
| 4-32 | I feel stressed when I do not find the time to exercise. | $5^a$ | 4 | .833* | .728 |
| 9-61 | I get upset when I miss my exercise activities. | $5^a$ | 4 | .806* | .746 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EP 1-3 refers to the first EP item and is the 3rd item of the TIMES. Item in bold text fit the factor analysis but did not meet the judgmental criteria. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". * = significant $VI_k$ coefficient.

Only the EP item 11-67 did not meet the criteria, however, according to a comment made by a judge, this most likely occurred because the word "value" may not have equaled priority. The EP item 11-67 was retained because it seemed to fit well with the remaining items. Additional comments made by panel members consisted of noting that items EP 1-3, EP 2-6, and EP 11-67 were negative in wording.

Of the eight items fitting Factor 1, five items were originally written for the EP subscale, two items for the ETMPE subscale, and one item from the SE subscale. Factor 1, consisting of mostly EP items and ETMPE items was renamed Exercise Importance (EI) with factor loadings ranging from 0.53 to 0.75. Exercise Importance was defined as: Focused commitment to exercise, making exercise a priority in life, acknowledgement of the importance of exercise, and feelings of anxiety or stress over lack of time for exercise.

*Judgmental analysis revisited for k=41: Factor 2.* Following the removal of items not loading on Factor 2 with at least a 0.50 level, the number of items was reduced from 14 to eight. The eight items fitting Factor 2 are presented in Table 30 along with their $R_k$, $Md_k$, and $VI_k$ ratings as well as their respective factor loadings.

Table 30

*Final Eight Items Fitting Factor 2*

| **Subscale** | **Item** | $R_k$ | $Md_k$ | $VI_k$ | **Factor Loading** |
|---|---|---|---|---|---|
| **ED** | | | | | |
| 4-23 | I record the amount of time I spend exercising on a day-timer or in a calendar. | 1 | 4 | 1.000* | .803 |
| 5-36 | My exercise schedule is written down. | $5^a$ | 3 | .750* | .698 |
| 6-45 | I use a day-timer to block out time for exercise. | $5^a$ | 4 | .833* | .678 |
| 7-52 | I keep an exercise diary, log, or workbook. | $5^a$ | 4 | .889* | .737 |
| 9-73 | I record my exercise sessions on a calendar. | $4^b$ | 4 | .861* | .810 |
| 10-77 | I check exercise off of my to do list as soon as I finish exercising. | $4^b$ | 4 | .861* | .599 |
| 11-83 | I document my exercise activities. | 3 | 4 | .889* | .790 |
| **12-86** | **I check my exercise to do lists frequently so I do not forget to exercise.** | **5** | **3** | **.639** | **.565** |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., ED 4-23 refers to the fourth ED item and is the 23rd item of the TIMES. Item in bold text fit the factor analysis but did not meet the judgmental criteria. [a] indicates high $R_k$ values due to outlying score(s) of a "0". [b] indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

Of the eight items fitting Factor 2, seven met the judgmental criteria. The sole item that did not meet the criteria was ED item 12-86 (I check my exercise to do lists frequently so I do not forget to exercise) but was retained due to a factor loading well above the criterion of 0.50 and substantive similarity to the remaining items. Comments by panel members consisted of noting that the ED items 5-36, 6-45, and 12-86 referred to scheduling or organizing. One judge also commented that item 5-36 needed to be made more active and thus for subsequent studies was changed to "I write my exercise schedule down".

All of the items fitting Factor 2 were originally written for the Exercise Documentation subscale with factor loadings ranging from 0.57 to 0.81. Factor 2 was named Exercise Documentation (ED) and defined as: Documentation, monitoring, and recording of future and completed exercise activities through the use of notes, "to do lists", calendars, diaries, logs, day-timers, and written exercise schedules.

*Judgmental analysis revisited for k=41: Factor 3.* The ten items fitting Factor 3 are presented in Table 31 along with their $R_k$, $Md_k$, and $VI_k$ ratings as well as their respective factor loadings.

Table 31

*Items Fitting Factor 3 (k=41)*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| ATES | | | | | |
| 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | 3 | 3 | .750* | .526 |
| **7-47** | **I often miss-out on my exercise activities because I am over-committed.** | **4** | **3** | **.583** | **.634** |
| **8-51** | **When I am very busy, I reallocate the time I set aside for exercise in order to do something else.** | **5** | **3** | **.694** | **.392** |
| 11-68 | I underestimate the time it will take to complete my exercise activities. | 4[b] | 4 | .833* | .396 |
| SE | | | | | |
| **2-15** | **I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time.** | **5** | **3.5** | **.750*** | **.516** |
| EO | | | | | |
| 1-1 | Because I am disorganized, I lack the time to exercise. | 3 | 3 | .997* | .487 |
| **5-34** | **I am often late for my exercise activities.** | **5** | **2** | **.556** | **.448** |
| **6-38** | **My exercise routine is inefficient.** | **4** | **3** | **.722*** | **.424** |
| EP | | | | | |
| **13-78** | **I do not know how to prioritize my activities to include exercise.** | **4** | **2** | **.639** | **.423** |
| GS | | | | | |
| 2-10 | My exercise goals are unrealistic. | 3 | 3 | .825* | .426 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EP 13-78 refers to the thirteenth EP item and is the 78th item of the TIMES. Item in bold text fit the factor analysis but did not meet the judgmental criteria. [b] indicates high $R_k$ values due to outlying score(s) of a "1". * = significant $VI_k$ coefficient.

In order to reduce the number of items fitting the subscale to eight, two items, (SEG 2-10 and EO 6-38) were eliminated. Item 2-10 (My exercise goals are unrealistic.) was originally written for the SEG subscale and met the judgmental criteria but was the only goal setting item to fit Factor 3. Furthermore, it was the only SEG item to fit any factor but Factor 4, which consists only of items pertaining to setting goals. Thus, item 2-10 was eliminated due to substantive differences. Item 6-38 (My exercise routine is inefficient), was originally written for the EO subscale but did not meet the judgmental criteria. EO item 6-38 was also substantively different from the remaining items in that it referred to an exercise *routine* when all other items referred to exercise or exercise activities. The item also made the assumption that all individuals have exercise routines and thus may have been irrelevant for some participants. With the removal of SEG item 2-10 and EO item 6-38 from Factor 3, the ten items were reduced to eight items (see Table 32).

Table 32

*Final Eight items Fitting Factor 3*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| ATES | | | | | |
| 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | 3 | 3 | .750* | .526 |
| **7-47** | **I often miss-out on my exercise activities because I am over-committed.** | **4** | **3** | **.583** | **.634** |
| **8-51** | **When I am very busy, I reallocate the time I set aside for exercise in order to do something else.** | **5** | **3** | **.694** | **.392** |
| 11-68 | I underestimate the time it will take to complete my exercise activities. | $4^b$ | 4 | .833* | .396 |
| SE | | | | | |
| **2-15** | **I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time.** | **5** | **3.5** | **.750*** | **.516** |
| EO | | | | | |
| 1-1 | Because I am disorganized, I lack the time to exercise. | 3 | 3 | .997* | .487 |
| **5-34** | **I am often late for my exercise activities.** | **5** | **2** | **.556** | **.448** |
| EP | | | | | |
| **13-78** | **I do not know how to prioritize my activities to include exercise.** | **4** | **2** | **.639** | **.423** |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EP 13-78 refers to the thirteenth EP item and is the 78th item of the TIMES. Item in bold text fit the factor analysis but did not meet the judgmental criteria. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". * = significant $VI_k$ coefficient.

Converse to the other factors, only three of the eight items fitting Factor 3 met the judgmental criteria. Half of the items remaining were originally written for the ATES subscale, while two items were EO items, and one item each came from SE and EP. Judges comments consisted of noting that the ATES items 6-41, 7-47, 8-51, and SE item

2-15 fit with EP, while EO item 5-34 was an assessment of time item and EP item 13-78 fit SE better.

Factor loadings on Factor 3 ranged from 0.39 to 0.63. Factor 3 contained items which focused on self-efficacy of exercise and was renamed Perceived Ability to Manage Time for Exercise (PAMTE). Perceived Ability to Manage Time for Exercise was defined as: The perceived ability to prioritize and maintain exercise priorities, the perceived ability to organize and schedule exercise activities, the perceived ability to accurately estimate the time required for exercise and the compatibility of chosen exercise activities and the awareness of personal time limitations for exercise.

*Judgmental analysis revisited for k=41: Factor 4*. Following the removal of remaining doublets after the *k*=62 factor analysis, only 8 items remained on Factor 4. Thus, no further factor analysis was required. The 8 items fitting Factor 4 are presented in Table 33 along with their $R_k$, $Md_k$, and $VI_k$ ratings as well as their respective factor loadings.

Table 33

*Final Eight Items Fitting Factor 4*

| Subscale | Item | $R_k$ | $Md_k$ | $VI_k$ | Factor Loading |
|---|---|---|---|---|---|
| **SEG** | | | | | |
| 3-13 | I periodically evaluate my exercise goals to see if they need changing. | $4^b$ | 4 | .825* | .545 |
| **6-37** | **My exercise goals are unclear.** | **5** | **3** | **.600** | **-.503** |
| 7-44 | I set short term exercise goals for what I want to accomplish each week. | 2 | 4 | .975* | .593 |
| 8-49 | I don't have long term exercise goals. | 2 | 3 | .850* | -.452 |
| 10-62 | I have short term exercise goals. | 2 | 4 | .950* | .731 |
| 11-65 | I have seasonal exercise goals. | 3 | 4 | .875* | .497 |
| 12-72 | I set challenging exercise goals for myself. | 2 | 4 | .725* | .613 |
| 13-84 | I revise my exercise goals when needed. | $4^b$ | 4 | .775* | .623 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., SEG 3-13 refers to the third SEG item and is the 13th item of the TIMES. Item in bold text fit the factor analysis but did not meet the judgmental criteria. $^a$ indicates high $R_k$ values due to outlying score(s) of a "0". * = significant $VI_k$ coefficient.

Of the 8 items fitting Factor 4, seven met the judgmental criteria. Judges' comments consisted of noting that the SEG items 8-49 and 11-65 were negatively worded and that it would be more appropriate to change all the "have" words in items 8-49, 10-62, and 11-65 to a more active term such as "set". The sole item to not meet the judgmental criteria was item 6-37 (My exercise goals are unclear).

All of the items that fit Factor 4 were originally written for the SEG subscale with factor loadings ranging from 0.45 to 0.73. The name of Factor 4 remained Setting Exercise Goals (SEG) but the definition of the subscale was clarified: Goal setting behavior including the setting of short term, long term, seasonal, specific, reasonable, clear, challenging, measurable goals related to exercise participation and adherence, and the revision of these goals when needed.

*Summary of 32 Item TIMES*

Table 34 presents the results of the factor analysis (principal axis extraction for four factors followed by oblimin transformation; Δ=0) of the remaining 32 items. The Scree plot identified four factors (see figure 5) with eigenvalues of 9.7, 3.7, 2.5, and 1.6. The four factors accounted for 53.0% of the variance.

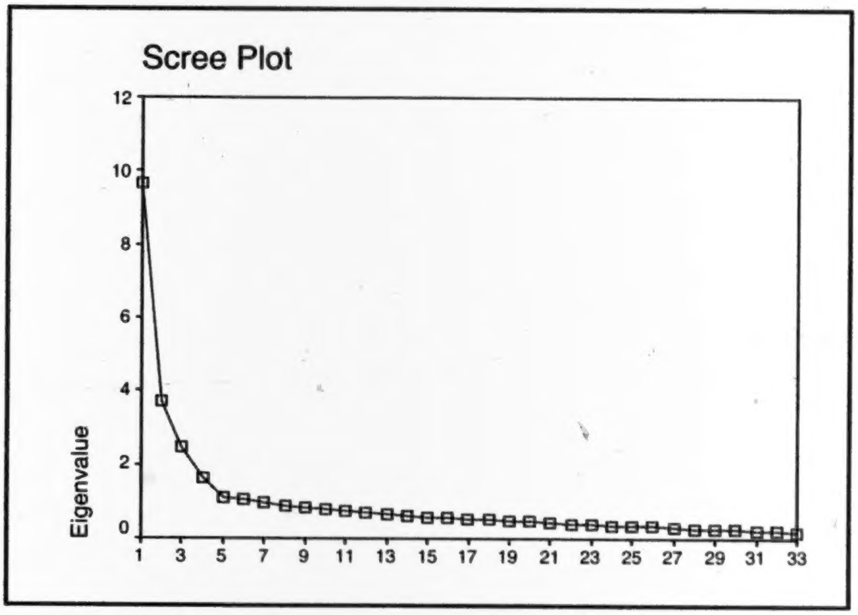

*Figure 5.* Scree plot identifying 4 factors (First empirical field test).

The results demonstrated pure simple structure with eight substantively meaningful marker items per subscale. Pattern coefficient values ranged from 0.380 to 0.809. Correlations between the scales ranged from -.03 to .54. There was strong convergence between the judges' ratings and two of the four factors: Exercise Documentation and Setting Exercise Goals. All of the items fitting the subscale Exercise Documentation were originally written for and judged by the panel of experts to fit the ED subscale of the first draft of the TIMES.

Table 34

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation (Δ =0; k =32)*

| # | Item | Item Description | Factor | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| Subscale Definition | | Exercise Importance: Focused commitment to exercise, making exercise a priority in life, acknowledgement of the importance of exercise, and feelings of anxiety and stress over lack of time for exercise. | | | | |
| 1 | EP 1-3 | Exercise is not a priority in my life. | **-.622** | .020 | .182 | -.039 |
| 2 | EP 2-6 | Finding the time to exercise is not important to me. | **-.641** | -.004 | .040 | -.107 |
| 3 | EP 3-11 | Exercise is an important part of my life. | **.761** | -.011 | -.059 | .075 |
| 4 | SE 3-22 | I reserve time in my daily schedule for exercise activities. | **.565** | .087 | -.237 | .137 |
| 5 | ETMPE 4-32 | I feel stressed when I do not find the time for exercise. | **.666** | .152 | .168 | -.036 |
| 6 | EP 7-40 | Exercise is among my top priorities. | **.673** | .115 | -.175 | .103 |
| 7 | ETMPE 9-61 | I get upset when I miss my exercise activities. | **.700** | .115 | .099 | .021 |
| 8 | EP 11-67 | I do not value exercise. | **-.572** | .087 | -.044 | -.141 |
| Subscale Definition | | Exercise Documentation: Documentation, monitoring, and recording of future and completed exercise activities through the use of notes, "to do lists', calendars, diaries, logs, day-timers, and written exercise schedules. | | | | |
| 9 | ED 4-23 | I record the amount of time I spend exercising in a day-timer or on a calendar. | .005 | **.809** | -.026 | .046 |
| 10 | ED 5-36 | My exercise schedule is written down. | .021 | **.694** | -.043 | .058 |
| 11 | ED 6-45 | I use a day-timer to block out time for exercise. | .092 | **.679** | .041 | -.020 |
| 12 | ED 7-52 | I keep an exercise diary, log, or workbook. | -.080 | **.731** | -.057 | .192 |
| 13 | ED 9-73 | I record my exercise sessions on a calendar. | -.090 | **.805** | .015 | .124 |
| 14 | ED 10-77 | I check exercise off my "to do list" as soon as I finish exercising. | .124 | **.604** | -.011 | -.097 |
| 15 | ED 11-83 | I document my exercise activities. | -.044 | **.793** | -.031 | .127 |
| 16 | ED 12-86 | I check my "to do lists" frequently so I do not forget to exercise. | .042 | **.567** | .078 | -.031 |

Table 34 continued

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation (Δ =0; k =32)*

| # | Item | Item Description | Factor | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| Subscale Definition | | Perceived Ability to Manage Time for Exercise: The perceived ability to prioritize and maintain exercise priorities, the perceived ability to organize and schedule exercise activities, the perceived ability to accurately estimate the time required for exercise and the compatibility of chosen exercise activities and the awareness of personal time limitations for exercise. | | | | |
| 17 | EO 1-1 | Because I am disorganized I lack the time for exercise. | -.134 | -.077 | **.472** | .058 |
| 18 | SE 2-15 | I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time. | .089 | .036 | **.541** | -.061 |
| 19 | EO 5-34 | I am often late for my exercise activities. | -.097 | .115 | **.408** | .005 |
| 20 | ATES 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | -.112 | .043 | **.522** | -.120 |
| 21 | ATES7-47 | I often miss-out on my exercise activities because I am over-committed. | -.069 | -.019 | **.692** | .065 |
| 22 | ATES 8-51 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | .134 | -.098 | **.416** | .055 |
| 23 | ATES 11-68 | I underestimate the time it will take to complete my exercise activities. | .035 | .059 | **.380** | -.084 |
| 24 | EP 13-78 | I do not know how to prioritize my activities so that I include exercise. | -.256 | -.039 | **.409** | -.070 |
| Subscale Definition | | Setting Exercise Goals: Goal setting behavior including the setting of short term, long term, seasonal, specific, reasonable, clear, challenging, measurable goals related to exercise participation and adherence, and the revision of these goals when needed. | | | | |
| 25 | SEG 3-13 | I periodically evaluate my exercise goals to see if they need changing. | .049 | .188 | -.132 | **.556** |
| 26 | SEG 6-37 | My exercise goals are unclear. | -.096 | -.003 | .259 | **-.476** |
| 27 | SEG 7-44 | I set short term exercise goals for what I want to accomplish each week. | -.072 | .100 | .083 | **.610** |
| 28 | SEG 8-49 | I don't have long term exercise goals. | -.083 | -.042 | .170 | **-.455** |
| 29 | SEG 9-62 | I have short term exercise goals. | .060 | -.006 | .041 | **.735** |
| 30 | SEG 10-65 | I have seasonal exercise goals. | .062 | -.024 | .099 | **.488** |
| 31 | SEG 11-72 | I set challenging exercise goals for myself. | .130 | .014 | -.054 | **.607** |
| 32 | SEG 13-84 | I revise my exercise goals when needed. | .082 | .173 | -.067 | **.627** |

*Note.* Items are identified by subscale number and overall number, i.e., SEG 3-13 refers to the third SEG item and is the 13th item of the TIMES. Values in bold indicate singlets.

The same pattern was true for Setting Exercise Goals. Five of the eight items fitting the factor Exercise Importance were originally designed for and judged relevant to the EP subscale of the first draft of the TIMES. Two of the items fitting Exercise Importance were originally written for the ETMPE subscale. As stated previously in Chapter 4, judges advocated the splitting of this subscale into two separate subscales. Furthermore, these were the only two items written for the ETMPE subscale to fit the reduced 32-item version of the TIMES. These items reflected the reactions of individuals when they could not find the time for exercise. The remaining item that loaded on the Exercise Importance factor was originally written for the SE subscale. This item, "I reserve time in my daily schedule for exercise" appears to fit the Exercise Importance subscale because it reflects the importance of exercise. If exercise is important, it will be scheduled.

The fourth factor, Perceived Ability to Manage Time for Exercise appears to be an inconvenience factor caused by individuals' inability to manage their time for exercise. Of the eight items fitting this factor, four items were originally written for the ATES subscale, two items were written for the EO subscale, and one item each was written for the SE and EP subscales. Regardless of which subscale the items were originally written to fit, four of the items (SE 2-15, EO 5-34, ATES 6-41, ATES 7-47) referred to the inconvenience of exercise and four of the items referred to inability to manage time (EO 1-1, SE 2-15, ATES 11-68, and EP 13-78).

### *Item Analysis*

Item analysis was conducted for each of the four subscales using the LERTAP 5 (Nelson, 2001) computer program. Analyses for each item included the calculation of the proportion of participants who selected each option, the item mean and standard deviation, the item-subscale correlation with all subscale items included, and the item-subscale correlation with adverse subscale items removed. In addition, internal consistency for each subscale was calculated (Cronbach, 1951). Summary item analysis results are presented in Table 35 with complete item subscale statistics presented in Appendix I.

Table 35

*Summary Results of TIMES Item Analysis*

| Subscale | *M* Scale | *SD* of Scale | *R* of Item Means | *R* of Item-subscale correlations | Internal Consistency |
|---|---|---|---|---|---|
| EI | 19.46 | 7.41 | 2.07-3.61 | .57-.78 | 0.895 |
| ED | 6.17 | 7.30 | 0.55-0.94 | .55-.79 | 0.906 |
| PAMTE | 21.26 | 5.69 | 1.94-3.09 | .30-.58 | 0.725 |
| SEG | 15.15 | 7.47 | 1.33-2.47 | .45-.69 | 0.850 |

*Note.* EI refers to Exercise Importance, ED refers to Exercise Documentation, PAMTE refers to perceived Ability to Manage Time for Exercise, and SEG refers to Setting Exercise Goals.

Three of the subscales (EI, ED, and SEG) had very good internal consistency values with the coefficient alphas ranging from 0.85 to 0.91. In comparison, the coefficient alpha for Factor 3 (PAMTE) was marginal. In an effort to increase coefficient alpha in subsequent studies, two items will be added to this factor as pilot test items. Item 2-8 (originally an ATES item) "I accurately estimate the amount of time it takes me to exercise" which loaded on Factor 1 ($k = 91$) with a value of 0.38 and loaded on Factor 1 ($k = 77$) with a value of 0.41. The *$Md_k$* judgmental ranking for this item was originally 4 with a range of 2, and a *$VI_k$* of 0.97. The second item, item 8-60, "I prepare the things I need for my exercise activities ahead of time" was originally created for the EO subscale. Despite not loading on the original 91-item factor analysis, this item will be added as a pilot item to Factor 3 due to strong judgmental ratings (*$Md_k$* score of 4, an *$R_k$* of 2, and a *$VI_k$* of 0.97) and substantive fit.

### *Characteristics of the TIMES*

*Descriptive statistics of the TIMES.* Descriptive statistics for all four of the TIMES subscales were calculated with the missing values replaced by the mean scores for the remaining items. Thus, 510 complete scale score values were calculated. Scores on the subscale, EI ranged from 2 to 32 with a mean of 19.6 (*SD* = 5.9). For the subscale SEG, the scores ranged from 0 to 32 with a mean of 15.1 (*SD* = 7.4). Scores on the subscale PAMTE ranged from 4 to 32 with a mean of 21.3 (*SD* = 5.6). Lastly, scores on the subscale ED ranged from 0 to 32 with a mean of 6.2 (*SD* = 7.2) (See Table 36).

Table 36

*Correlations, Means, and Standard Deviations Among the TIMES Factors*

| Factor | Exercise Importance (EI)[a] | Setting Exercise Goals (SEG)[a] | Perceived Ability to Manage Time for Exercise (PAMTE)[a] | Exercise Documentation (ED)[a] |
|---|---|---|---|---|
| EI | 0.90 | | | |
| SEG | 0.28 | 0.91 | | |
| PAMTE | -0.22 | -0.03 | 0.73 | |
| ED | 0.54 | 0.40 | -0.26 | 0.85 |
| *M* | 19.60 | 15.10 | 21.30 | 6.20 |
| *SD* | 5.90 | 7.40 | 5.60 | 7.20 |

*Note.* Means and *SD* were computed with missing values replaced with the mean scores for the remaining items. Subscale internal consistency values were placed on the diagonal. [a] refers to correlations calculated using pairwise exclusion.

*Correlations between TIMES subscales and other scales.* The TIMES subscale scores were then correlated with time management and exercise behaviors (see Table 37).

Table 37

*Correlations Among the TIMES Subscales and Time Management and Exercise Behavior Variables*

| Factor/ Variable | EI | SEG | P | ED | Stren | Mod | Mild | LSI | FTM | IFTM |
|---|---|---|---|---|---|---|---|---|---|---|
| EI | 1.00 | | | | | | | | | |
| SEG | .59** | 1.00 | | | | | | | | |
| P | .27** | .33** | 1.00 | | | | | | | |
| ED | .39** | .47** | .08 | 1.00 | | | | | | |
| Stren | .42** | .39** | .32** | .22** | 1.00 | | | | | |
| Mod | .23** | .17** | .10* | .10* | .58** | 1.00 | | | | |
| Mild | .06 | .08 | -.01 | .04 | .42** | .73** | 1.00 | | | |
| LSI | .38** | .34** | .26** | .19** | .95** | .80** | .65** | 1.00 | | |
| FTM | -.02 | .09* | .03 | .10* | .03 | .04 | .07 | .04 | 1.00 | |
| IFTM | .04 | .08 | -.07 | .15** | -.03 | -.07 | -.03 | -.05 | .34** | 1.00 |

*Note.* EI refers to Exercise Importance. SEG refers to Setting Exercise Goals. P refers to Perceived Ability to Manage Time for Exercise. ED refers to Exercise Documentation. Stren refers to strenuous exercise. Mod refers to moderate exercise. Mild refers to mild exercise. LSI refers to leisure score index. FTM refers to formal time management experience. IFTM refers to informal time management experience. ** $p < .001$; * $p < .05$.

It was anticipated that positive relationships would exist between the subscales of the TIMES and exercise behavior. Overall exercise behavior, as measured by Godin's Leisure Score Index, was significantly related to all four TIMES subscales with correlations ranging from .19 to .38. The pattern of relationships between the TIMES subscales and the different levels of exercise intensity were consistent with stronger significant relationships existing for strenuous and moderate exercise activity levels. Stronger relationships also existed between moderate and strenuous intensity exercise and EI and SEG.

It was also anticipated that positive relationships would exist between the subscales of the TIMES and formal and informal time management experiences. However, no obvious pattern of relationship existed between the TIMES subscales and time management behavior as measured by formal and informal time management experiences. The only TIMES subscales to be significantly related to formal time management experience were SEG and ED. Exercise Documentation was the only TIMES subscale to be significantly related to informal time management experience. However, none of these relationships were practically significant.

The TIMES subscale scores were also correlated with the theory of planned behavior subscales (see Table 38).

Table 38

*Correlations Among the TIMES Subscales and Theory of Planned Behavior Variables*

| Factor/ Variable | EI | SEG | P | ED | Int | Mot | Barr | L of T | PCT |
|---|---|---|---|---|---|---|---|---|---|
| EI | 1.00 | | | | | | | | |
| SEG | .59** | 1.00 | | | | | | | |
| P | .27** | .33** | 1.00 | | | | | | |
| ED | .39** | .47** | .08 | 1.00 | | | | | |
| Int | .64** | .55** | .26** | .30** | 1.00 | | | | |
| Mot | .42** | .33** | .02 | .22** | .36** | 1.00 | | | |
| Bar | -.48** | -.41** | -.49** | -.21** | -.40** | -.06 | 1.00 | | |
| L of T | -.24** | -.25** | -.48** | -.16** | -.25** | .04 | .60** | 1.00 | |
| PCT | .37** | .34** | .44** | .22** | .43** | .15** | -.48** | -.47** | 1.00 |

*Note.* EI refers to Exercise Importance. SEG refers to Setting Exercise Goals. P refers to Perceived Ability to Manage Time for Exercise. ED refers to Exercise Documentation. Int refers to intention to exercise. Mot refers to motives for exercise. Bar refers to barriers to exercise. L of T refers to lack of time for exercise. PCT refers to perceived control over time. ** p <.001; * p < .05.

It was anticipated that participants with more intentions, motives, and perceived control over time for exercise would score higher on the subscales of the TIMES. This pattern was seen for some but not all of the subscales. For example, significant relationships were found between exercise intentions and all TIMES subscales with EI and SEG showing stronger relationships. Exercise motives was significantly related to EI, SEG, and ED but not to PAMTE. In contrast, although all TIMES subscales were significantly related to perceived control over time for exercise, PAMTE showed the strongest relationship.

Participants with fewer barriers to exercise and those who felt that time was not a major barrier to exercise were expected to score higher on the TIMES subscales. All of the TIMES subscales were significantly related to exercise barriers and lack of time for exercise. Exercise Documentation showed the weakest relationship to both exercise barriers and lack of time for exercise.

### *Conclusion*

Following the empirical validation of the TIMES, four independent but related subscales were identified: Exercise Importance, Setting Exercise Goals, Exercise Documentation, and Perceived Ability to Manage Time for Exercise. Each of the subscales consists of 8 items and all 32 of the items loaded significantly on their respective factors. The internal consistency values of the subscales were good (i.e., > 0.80) for three of the four subscales (EI, SEG, and ED). Across the four subscales, 75.0% of the items were deemed relevant by a panel of expert judges and across the EI, SEG, and ED subscales, 87.5% of the items were considered relevant.

Time management for exercise participation and adherence, as measured by the 32-item TIMES, appears to be related to exercise behavior in the student population examined with higher scores on the subscales significantly related to more exercise behavior. Furthermore, the subscales appear to support the theory of planned behavior with significant relationships across the theory of planned behavior variables.

In an attempt to increase the internal consistency value calculated for Factor 3, PAMTE ( $\hat{\alpha}=0.73$ ), above a value of 0.80 (Rogers, 2000) and to ensure content representativeness, two additional pilot test items will be added to this subscale in the next edition of the TIMES resulting in 10 items for this subscale. These items are, “Furthermore, an additional three items will be added to the SEG subscale as pilot test items due to panel member feedback. For example, one judge strongly suggested adding the item, “I set goals for my exercise participation and adherence”. The other two items are compilations of modifications suggested by the majority of reviewers, “I set specific exercise goals (e.g., I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g., I am going to start exercising more often)” and “I set exercise goals that are reasonable for me”. This will result in a 37-item TIMES scale with eight items for each of the EI and ED subscales, ten items for the PAMTE subscale, and eleven items for the SEG subscale.

# CHAPTER SIX

# Empirical Validation of the Second Draft of the Time Management Exercise Scale

## *Introduction*

The purpose of the present chapter is to describe the empirical validation methodology and results of the second draft of the TIMES. The chapter consists of three sections: methodology, results, and additional validity evidence for the TIMES. The methodology section includes descriptions of the data collection procedures, instrumentation, and statistical data analysis. The empirical validation results based on the second data collection are presented next and include a detailed description of the samples as well as the results of the item, confirmatory factor, and exploratory factor analyses. The final section of the chapter consists of additional evidence of the validity of the interpretation of scores from the third edition of the TIMES.

## *Empirical Validation Methodology*

### *Data Collection*

The purpose of the second field study was to provide empirical validity evidence for the reduced 37-item TIMES. Similar to the first field study, professors teaching two sections of a required education class in the Faculty of Education were approached in late summer 2002 and asked to participate for a second time. Across the two classes, a sample of 522 undergraduate university students was approached to complete the second edition of the TIMES. A sample of this size allowed for replication of the analyses. Due to the anonymous nature of the data collection process, no formal attempt was made to ensure that students completing the second draft of the TIMES had not already participated in the initial empirical study. Furthermore, participants for the second empirical study (Fall 2003) were recruited from the *same* required education class in the Faculty of Education as participants from the first empirical study (Winter 2002). Due to the low failure rate for this required class and the tendency for students who fail to repeat the course during the summer session, it is unlikely that participants would have participated in both studies.

The students responded to the second draft of the TIMES during class time during the month of November 2002. For both of the participating sections, a guest lecturer provided the introduction and explanation of the study to the students and requested student participation. Participation in the study was voluntary. Students were asked to provide their consent to participate and were required to sign an informed consent form attached to the front of the TIMES. Once consent had been obtained, students were asked to complete the TIMES and the background questionnaire.

### *Instrumentation*

*The Time Management Exercise Scale.* The second draft of the TIMES was composed of 8 items for each of the EI and ED subscales, 10-items for the PAMTE subscale (8 items plus the 2 new items developed for this subscale), and 11-items for the SEG subscale (8 items plus 3 new items) resulting in a total of 37 items. Participants were asked to indicate how well each item described their current behavior using a five-point Likert-type response format ranging from 0 *(does not describe me at all)* to 4 *(describes me very well)*. The five new items developed for the second edition of the TIMES were positive in polarity. No changes were made to the polarity in the second draft of all first edition TIMES items. This resulted in a total of 11 (29.7%) items with negative polarity. However, the items with reversed polarities were not distributed equally across the four subscales. To avoid possible bias brought about by items within each subscale appearing one after another, subscale items were randomly interspersed (Rogers, 2000).

*The background questionnaire.* Demographic information collected included gender, age, part-time or full-time student status, and current hours of employment, volunteer work, and studying. Information was also collected on previous formal and informal time management experience, current exercise behavior, stage of exercise behavior change, and the following theory of planned behavior based variables: (a) exercise motives, (b) exercise barriers, and (c) perceived control over time for exercise. Each of the theory of planned behavior variables was assessed and calculated according to the procedures utilized in the first empirical sample (see pages 127-130). It was anticipated that positive relationships would exist between the TIMES subscales and time management experience. It was also anticipated that the TIMES subscales would be related to exercise behavior with more active participants scoring higher on the subscales. In terms of the theory of planned behavior, it was anticipated that participants with more motives to exercise, fewer exercise barriers, and more perceived control over time for exercise would score higher on the subscales of the TIMES.

Similar to the first field study, current exercise behavior was assessed using Godin's Leisure Time Exercise Questionnaire (GLTEQ: Godin et al., 1986; Godin & Shepard, 1985) and the frequency and METS for mild, moderate, strenuous, and overall exercise (using the Leisure Score Index) were calculated (see page 127). Following the recent national trend in exercise participation assessment (CFLRI, 2001), stage of change (SOC) for exercise was also assessed in the second field study using an instrument adapted by Marcus, Selby, Niaura, and Rossi (1993) and Courneya (1995). This instrument queried participants about their regular exercise participation and categorized participants into one of five groups ordered along the stages of change for exercise continuum: Pre-contemplation, Contemplation, Preparation, Action, or Maintenance.

The theory of planned behavior variables of exercise motives, exercise barriers, and perceived control over time were all assessed in an identical manner to the first field study (see pages 127-130). Although it was estimated that approximately ten minutes would be needed to complete the introduction, the self-administered TIMES, and the background questionnaire, actual completion time was approximately 15 minutes. A copy of the informed consent form, TIMES, and the background questionnaire is located in Appendix J.

### *Analyses of Empirical Validation Data*

*Data entry and integrity.* All data were entered, cleaned, and 100% verified by professional data entry personnel at Accurate Data Services, Edmonton.

*Missing item-level data.* In order to avoid missing data, all participants were encouraged to answer each and every item. When missing item-level data was discovered for a participant in the calculation of a TIMES subscale, the mean score based on the remaining items was calculated and then imputed (Spielberger, 1983). Missing background questionnaire data were subject to pairwise deletion.

*Statistical analysis of the TIMES data.* In order to replicate the analyses to determine the stability of the findings, the sample was randomly partitioned into two subsamples of participants (sample 1 and sample 2). The nature of each of these subsamples was explored by examining frequency distributions, and measures of central tendency and variability for all demographic, time management experience, exercise, and theory of planned behavior items. All further analyses were initially performed on the first subsample (sample 1), with the second subsample (sample 2) retained *blind* in order for subsequent use in replicating the initial analysis.

The structure of the items constituting the second draft of the TIMES was examined in three sequential steps, with the method at each stage contingent on the results of the preceding step. First, confirmatory factor analysis was conducted using the LISREL 8 (Joreskog & Sorbom, 1996) computer program to test the hypothesized four factor structure of the 37-item TIMES for sample 1. Despite the abundance of fit indices, there is little agreement on the best index of model fit (Gierl & Rogers, 1996). Moreover, there are a variety of concerns regarding the most commonly utilized fit index in structural analysis, the $\chi^2$ omnibus test (Elliot, 1994). Therefore, following the recommendation of Hayduck (1996), the sample data was fitted to the four factor model and tested using five different fit indices for consensus and convergence. These indices include: (a) $\chi^2$ omnibus test complemented by a report of the probability and degrees of freedom (Hayduck, 1996); (b) Chi-square/degrees of freedom ratio ($\chi^2$/df: Marsh, Balla, & McDonald, 1988); (c) Root Mean Square Error of Approximation (RMSEA: Browne & Cudek, 1993); (d) Root Mean Residual (RMR: Hayduck, 1996); and (e) Adjusted Goodness of Fit (AGFI: Hayduck, 1996). If the hypothesized four factor structure did not fit the 37-item TIMES, then the CFA analysis was to be repeated with the five new test items removed from the TIMES. If the hypothesized four factor structure did not fit the 32-item TIMES, then the same exploratory factor analyses that were used to identify the number of latent factors in the first field test would be repeated (see pages 131, 139-142).

When factor patterns portraying simple structure and salient loadings were obtained, the factor patterns were then assessed for a substantively meaningful solution.

Item analyses were then conducted to determine the number of items required per subscale while maintaining a minimal internal consistency value of 0.70 (Nunnally, 1978; Nunnally & Bernstein, 1994). Items tentatively chosen for the final TIMES instrument, were selected to maximize internal consistency without losing content relevance or representativeness.

In order to discover whether the results of the item and factor analytic procedures were replicable (Yu, 2003), the full set of analyses conducted with the first subsample of data were repeated with the second subsample of students (sample 2). If a common solution across both subsamples was found and a subsequent test of homogeneity of variance was nonsignificant, then the final factor analyses used with each of the subsamples was repeated for the entire sample ($N = 430$). The factor subscale scores were then correlated with other demographic, exercise, and TPB variables to see if the relationships were congruent with what was expected, thereby providing additional evidence of validity.

## *Empirical Validation Results*

### *Subsample Characteristics*

Of the 522 undergraduate University of Alberta students approached, 430 students from two sections of a required education class ($n_1 = 234$; $n_2 = 196$) in the Faculty of Education completed the TIMES (response rate = 82.4%). In order to replicate the analyses, the total sample was randomly divided into two equal size samples of participants using SPSS ($n_1 = 215$; $n_2 = 215$). The majority of participants in both samples were female (sample 1 = 72.1% and sample 2 = 75.7%), had never been married (71.2% and 71.4%, respectively), were registered as full time students (100.0%; 99.5%), and were working on their first university degree (69.7%; 72.9%). Over one half (55.3%; 57.7%) of the participants were engaged in paid employment but less than 20% (17.7%; 16.2%) worked more than 20 hours per week. Approximately one third of the participants in both samples (39.3%; 33.2%) were engaged in unpaid volunteer work with approximately three quarters (74.4%; 75.7%) volunteering between one and five hours per week. The samples did not differ significantly ( $p \geq 0.05$ ) in gender, marital, registration, or employment status (See Table 39).

Table 39

*Demographic Differences Between Samples*

| Variable | df | $\chi^2$ | $p$ |
|---|---|---|---|
| Gender | 1 | 1.71 | .395 |
| Marital Status | 4 | 0.25 | .993 |
| Student Registration Status | 1 | 1.01 | .316 |
| Paid Employment Status | 1 | 0.29 | .588 |
| Volunteer Employment Status | 1 | 1.71 | .191 |

Participants in the first sample ranged in age from 19 to 46 years with a mean age of 24.4 years (*SD* = 5.3), while participants in the second sample ranged in age from 19 to 58 years with a mean age of 24.7 years (*SD* = 6.4). Hours spent studying per week ranged from 0 to more than 40 hours, with more than half (59.8%; 57.0%) of the participants in both samples studying more than ten hours per week. The samples were not significantly different in age, hours spent studying, hours of paid employment, or hours of volunteer work (Table 40).

Table 40

*Mean Demographic Differences Between Samples*

| Variable | *n* | *M* | *SD* | *df* | *t* | *p* |
|---|---|---|---|---|---|---|
| Age | 209 | 24.4 | 5.3 | 418 | -0.53 | .595 |
|  | 211 | 24.7 | 6.4 |  |  |  |
| Study Hours | 214 | 4.3 | 1.8 | 426 | 0.65 | .518 |
|  | 214 | 4.2 | 1.8 |  |  |  |
| Hours of Paid Employment | 136 | 3.7 | 2.0 | 270 | -1.37 | .171 |
|  | 136 | 4.1 | 2.1 |  |  |  |
| Hours of Volunteer Employment | 108 | 2.1 | 0.9 | 201 | 0.85 | .395 |
|  | 95 | 2.0 | 0.8 |  |  |  |

*Time management experience.* Approximately one quarter (27.6% and 28.2%) of the participants in both samples responded that they had formal time management training. Of the participants with formal time management training, approximately one third of the participants (33.3%; 33.8%) had attended a time management workshop offered by their employer, and approximately one quarter of the participants (23.3%; 25.4%) had attended some other type of formal time management training workshop. While the two samples differed somewhat in the percentage who had attended University of Alberta workshops (30.0%; 22.0%), and the percentage who had attended a time management class offered off-campus (36.7%; 54.0%), the differences were not significant at the .05 level of significance. Likewise, while the percentages of the two samples that experienced informal time management training (26.5%; 19.1%) appeared to differ, the difference was not significant. Of those participants with informal time management experience, more than one half in both samples (57.9%; 63.4%) had read books, one half (50.8%; 53.7%) had watched TV programs, and one tenth (10.5%; 9.8%) had experienced informal time management through some other method. Lastly, while the percentages of participants who watched time management videos appeared to differ (26.3%; 39.0%), this difference was not significant (see Table 41).

Table 41

*Mean Differences in Time Management Between Samples*

| Variable | *df* | $\chi^2$ | *p* |
|---|---|---|---|
| Overall Formal Time Management | 1 | 0.91 | .890 |
| U of A | 1 | 0.87 | .351 |
| Employer Workshops | 1 | 0.29 | 1.000 |
| Off-campus Workshops | 1 | 2.12 | .146 |
| Other Formal | 1 | 0.04 | .848 |
| Overall Informal Time Management | 1 | 3.39 | .066 |
| Books | 1 | 0.96 | .327 |
| Videos | 1 | 0.04 | .852 |
| TV Programs | 1 | 1.01 | .296 |
| Other Informal | 1 | 0.41 | .522 |

*Exercise behavior.* Both samples contained approximately equal distributions of active (Maintenance or Action) and inactive (Precontemplation, Contemplation, and Preparation) participants as defined by the stages of exercise change (see Table 42).

Table 42

*Distribution of Participants Across the Exercise Stages of Change by Sample*

| Sample | Activity Level | Stage of Exercise Change | *n* | % |
|---|---|---|---|---|
| 1 | Active | Maintenance | 79 | 37.4 |
| | | Action | 24 | 11.4 |
| | Inactive | Preparation | 35 | 16.6 |
| | | Contemplation | 47 | 22.3 |
| | | Precontemplation | 26 | 12.3 |
| | Total | | 211 | 100.0 |
| 2 | Active | Maintenance | 77 | 36.0 |
| | | Action | 39 | 18.2 |
| | Inactive | Preparation | 37 | 17.3 |
| | | Contemplation | 34 | 15.9 |
| | | Precontemplation | 24 | 12.6 |
| | Total | | 214 | 100.0 |

There were no statistically significant differences between the two samples in terms of exercise stage of change. Furthermore, there were no statistically significant differences in the amount of mild, moderate, strenuous, or total exercise performed by participants across the two samples. Participants engaged in approximately 15 METS of mild, 16 METS of moderate, 15 METS of strenuous, and 32 METS of overall exercise per week (see Table 43).

Table 43

*Mean Differences in Exercise Activity Between the Two Samples*

| Activity Level | Sample | *M* METS | *SD* | *df* | *t* | *Eta*$^2$ |
|---|---|---|---|---|---|---|
| Strenuous | 1 | 13.7 | 15.6 | 1, 428 | 2.24 | 0.005 |
| | 2 | 16.0 | 16.2 | | | |
| Moderate | 1 | 16.7 | 15.7 | 1, 428 | 0.75 | 0.002 |
| | 2 | 12.5 | 11.9 | | | |
| Mild | 1 | 10.8 | 15.2 | 1, 428 | 0.47 | 0.001 |
| | 2 | 9.9 | 11.7 | | | |
| Total (LSI) | 1 | 38.2 | 31.2 | 1, 428 | 0.01 | 0.000 |
| | 2 | 38.4 | 30.5 | | | |

*Theory of planned behavior variables.* The responses to the five exercise motives items were summed to create an exercise motives scale (Courneya, 1995). The coefficient alpha for these items was poor ($\hat{\alpha}_N = .55$; $\hat{\alpha}_{n_1} = .53$; $\hat{\alpha}_{n_2} = .57$). The mean score on the exercise motives scale was 18.4 (*SD* = 3.2) for the first sample and 18.6 (*SD* = 3.4) for the second sample indicating that on average, participants considered the five motives to be important reasons to exercise. There were no statistically significant differences between the two samples (Table 44).

Table 44

*Mean Differences in Exercise Motives Between the Two Samples*

| Exercise Motives | *n* | *M* | *SD* | *df* | *t* | *p* |
|---|---|---|---|---|---|---|
| Overall Motives for Exercise | 215[a] | 18.4 | 3.2 | 428 | -0.80 | .426 |
| | 215[a] | 18.6 | 3.4 | | | |
| Fitness and Health | 212 | 4.5 | 0.7 | 423 | 0.41 | .683 |
| | 213 | 4.5 | 0.8 | | | |
| Physical Appearance | 211 | 4.1 | 1.0 | 422 | -0.44 | .659 |
| | 213 | 4.1 | 1.0 | | | |
| Weight Control | 211 | 3.8 | 1.2 | 420 | -0.86 | .389 |
| | 211 | 3.9 | 1.3 | | | |
| Socializing | 210 | 2.2 | 1.3 | 420 | -1.34 | .182 |
| | 212 | 2.3 | 1.3 | | | |
| Stress Relief | 211 | 3.9 | 1.2 | 420 | -0.05 | .958 |
| | 213 | 3.9 | 1.1 | | | |

*Note.* [a] refers to calculations where for particular participants, missing item-level data was replaced with the mean score based on the remaining items.

Similarly, the five exercise barrier items were summed (Courneya, 1995). The coefficient alpha for the exercise barrier scale was marginal ($\hat{\alpha}_N = .66$; $\hat{\alpha}_{n_1} = .62$; $\hat{\alpha}_{n_2} = .68$). The mean score on the exercise barrier scale was 14.2 (*SD* = 4.1) for the first sample and 14.5 (*SD* = 4.5) for the second sample indicating that on average, participants considered the five barriers to be of moderate importance. Furthermore, there were no statistically significant differences between the two samples (Table 45).

Table 45

*Mean Differences in Exercise Barriers Between the Two Samples*

| Exercise Barriers | *n* | *M* | *SD* | *df* | *t* | *p* |
|---|---|---|---|---|---|---|
| Overall Exercise Barriers | 215[a] | 14.2 | 4.1 | 428 | -0.87 | .383 |
| | 215[a] | 14.5 | 4.5 | | | |
| Lack of Time/Too Busy | 212 | 3.9 | 1.3 | 424 | -1.01 | .314 |
| | 214 | 4.0 | 1.3 | | | |
| Lack of Energy/Too Tired | 212 | 3.2 | 1.2 | 423 | -0.15 | .885 |
| | 213 | 3.2 | 1.3 | | | |
| Lack of Motivation | 212 | 2.9 | 1.4 | 423 | 0.21 | .835 |
| | 213 | 2.9 | 1.4 | | | |
| Too Expensive | 212 | 2.0 | 1.2 | 423 | -1.04 | .298 |
| | 213 | 2.1 | 1.4 | | | |
| Lack of Convenient Facilities | 212 | 2.2 | 1.3 | 423 | -0.90 | .368 |
| | 213 | 2.3 | 1.5 | | | |

*Note.* [a] refers to calculations where for particular participants, missing item-level data was replaced with the mean score based on the remaining items.

Scores on each of the three perceived control over time for exercise items were summed to create the perceived control over time for exercise scale. The reliability of this scale was fair ($\hat{\alpha}_N = .77$ $\hat{\alpha}_{n_1} = .72$; $\hat{\alpha}_{n_2} = .80$). The mean score on the perceived control over time for exercise scale was 13.7 (*SD* = 3.7) for the first sample and 13.3 (*SD* = 4.3) for the second sample indicating that on average, participants believed they had a moderate degree of control over their ability to manage their time for exercise. Once again, there were no statistically significant differences between the two samples (Table 46).

Table 46

*Mean Differences in Perceived Control Over Time for Exercise Between the Two Samples*

| Control Over Time For Exercise | *n* | *Mean* | *SD* | *df* | *t* | *p* |
|---|---|---|---|---|---|---|
| Overall Control | 215[a] | 13.7 | 3.7 | 428 | 1.01 | .313 |
| | 215[a] | 13.3 | 4.3 | | | |
| Easy – Difficult | 212 | 4.0 | 1.4 | 418 | 0.38 | .705 |
| | 214 | 4.0 | 1.7 | | | |
| Disagree – Agree | 212 | 4.9 | 1.7 | 423 | 1.43 | .153 |
| | 213 | 4.6 | 1.9 | | | |
| Very Little Control – Complete Control | 212 | 4.9 | 1.5 | 423 | 0.86 | .393 |
| | 213 | 4.8 | 1.6 | | | |

*Note.* [a] refers to calculations where for particular participants, missing item-level data was replaced with the mean score based on the remaining items.

*Summary of subsample characteristics.* In order to replicate the analyses with the expectation that the two sets of results will be similar, the data must be randomly partitioned into two or more similar subsamples. Comparisons between the two samples showed that there were no statistically significant differences between the two samples on any of the demographic, exercise, or theory of planned behavior variables.

### *Sample 1 Confirmatory Factor Analysis Results*

The results of the hypothesized 37-item, four factor model confirmatory factor analysis demonstrated that the model did not fit the data (Table 47). Although one criterion, the RMSEA value, indicated that the model fit the data, the four remaining criteria indicated that the model did not fit.

Table 47

*Results of Confirmatory Factor Analysis ($n_1$ =196; k=37)*

| Index of Fit | Index Value | Criterion to Fit | Fit/No Fit |
|---|---|---|---|
| Chi-Square | 1350.40 (df = 623) $p = 0.0$ | Statistically Nonsignificant[a] | No Fit |
| $\chi^2$/df | 2.17 | 2.0 or Less[b] | No Fit |
| RMSEA | 0.08 | 0.08 or Less[c] | Fit |
| RMR | 0.13 | 0.05 or Less[a] | No Fit |
| AGFI | 0.66 | 0.95 or More[a] | No Fit |

*Note:* [a] reference from Hayduck, 1996; [b] reference from Marsh et al., 1988; [c] reference from Browne & Cudek, 1993.

In view of the fact that the four factor model based on the 37-item TIMES was not confirmed, the analysis was repeated after deleting the five new items to see if these five items were the source of non-confirmation. As shown in Table 48, the results revealed that the five items were not the source of non-fit. Consequently, exploratory factor analyses were performed using the 35-item version of the TIMES to determine the underlying structure of the second draft of the TIMES.

Table 48

*Results of Confirmatory Factor Analysis ($n_1$ = 196; k=32)*

| Index of Fit | Index Value | Criterion to Fit | Fit/No Fit |
|---|---|---|---|
| Chi-Square | 1148.00 (df = 459) $p = 0.0$ | Statistically Nonsignificant[a] | No Fit |
| $\chi^2$/df | 2.50 | 2.0 or Less[b] | No Fit |
| RMSEA | 0.09 | 0.08 or Less[c] | No Fit |
| RMR | 0.27 | 0.05 or Less[a] | No Fit |
| AGFI | 0.69 | 0.95 or More[a] | No Fit |

*Note:* [a] reference from Hayduck, 1996; [b] reference from Marsh et al., 1988; [c] reference from Browne & Cudek, 1993.

### *Sample 1 Exploratory Factor Analysis Results*

*Sample 1 factor extraction results.* Six factors were identified according to the Kaiser-Guttman rule (Kaiser, 1960), accounting for 63.6% of the variance. Cattell's (1966) Scree plot criteria identified 3 factors (Figure 6). Results of the image extraction followed by varimax rotation (Kaiser, 1962) identified 5 factors. Thus, the number of factors identified by the three procedures ranged from 3 to 6. Subsequent factor rotations and transformations were conducted for 3 through 6 factors inclusive.

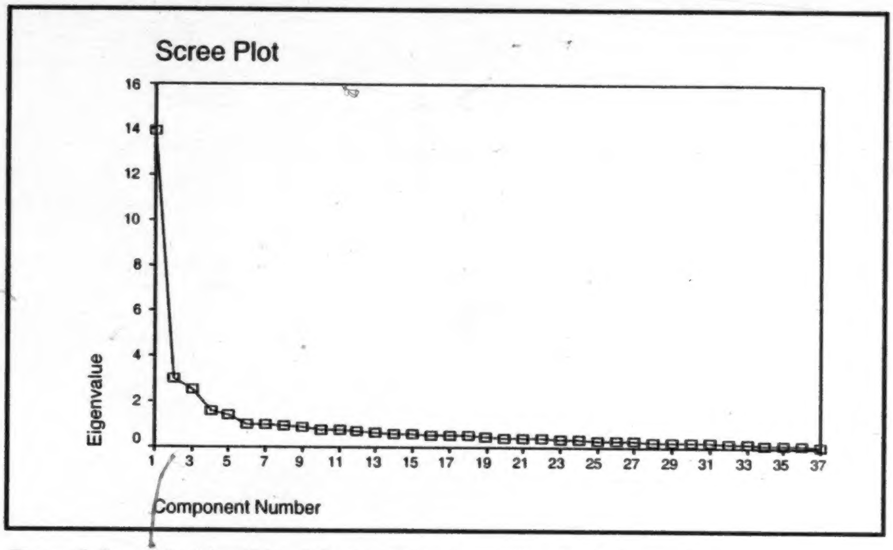

*Figure 6.* Scree plot identifying 3 factors (Second empirical field test, sample 1).

*Sample 1 results of factor rotations and transformations.* According to the guidelines of parsimony, simple structure, and salient loadings, the best fitting solution was a principal axis extraction for 4 factors followed by oblimin transformation with delta set equal to zero (see Table 49).

Table 49

*Results of Exploratory Factor Analysis for Sample 1 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=37)*

| Item # | Item Description | Factor | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| PAMTE 1-1 | I lack the time to exercise because I am disorganized. | -0.06 | -0.14 | 0.24 | 0.28 |
| EI 1-2 | Exercise is not a priority in my life. | 0.16 | -0.07 | -0.01 | **0.81** |
| SEG 1-3* | I set goals for my exercise participation and adherence. | 0.26 | 0.06 | 0.06 | **-0.39** |
| EI 2-4 | Finding the time to exercise is not important to me. | 0.03 | -0.03 | -0.03 | **0.65** |
| ED 1-5 | I check exercise off of my "to do list" when I finish exercising. | -0.06 | **0.47** | 0.25 | -0.25 |
| SEG 2-6 | I evaluate my exercise goals. | **0.48** | 0.23 | 0.08 | -0.18 |
| PAMTE 2-7 | I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | 0.20 | 0.02 | **0.54** | -0.08 |
| EI 3-8 | I reserve time in my daily schedule for exercise. | 0.15 | 0.16 | -0.04 | **-0.61** |
| ED 2-9 | I record the amount of time I spend exercising in a day-timer or on a calendar. | 0.02 | **0.80** | -0.09 | -0.03 |
| SEG 3-10* | I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | **0.63** | 0.10 | -0.07 | -0.10 |
| EI 4-11 | I feel stressed when I do not find the time to exercise. | 0.12 | 0.07 | 0.15 | **-0.56** |
| PAMTE 3-12 | I am never late for my exercise activities. | 0.20 | 0.21 | -0.01 | -0.25 |
| ED 3-13 | I write my exercise schedule down. | 0.24 | **0.68** | -0.06 | -0.03 |
| SEG 4-14 | My exercise goals are unclear. | -0.19 | -0.11 | **0.37** | 0.29 |

Table 49 continued

*Results of Exploratory Factor Analysis for Sample 1 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=37))*

| **Item #** | **Item Description** | **Factor** | | | |
|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** |
| EI 5-15 | Exercise is among my top priorities. | 0.12 | 0.11 | -0.02 | **-0.76** |
| PAMTE 4-16 | The exercise activities I enjoy are inconvenient because they take up too much time. | -0.09 | 0.13 | **0.46** | **0.30** |
| ED 4-17 | I use a day-timer to block out time for exercise. | -0.03 | **0.84** | -0.02 | -0.07 |
| SEG 5-18 | I set short term exercise goals for what I want to accomplish each week. | **0.40** | **0.37** | 0.07 | -0.05 |
| PAMTE 5-19 | I often miss-out on my exercise activities because I am over-committed. | 0.05 | -0.15 | **0.62** | 0.06 |
| SEG 6-20 | I don't set long term exercise goals. | **-0.44** | -0.01 | 0.22 | 0.16 |
| PAMTE 6-21 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | 0.18 | -0.15 | **0.52** | -0.14 |
| ED 5-22 | I keep an exercise log or diary. | 0.25 | **0.60** | -0.10 | 0.04 |
| SEG 7-23 | I set short term exercise goals. | **0.71** | 0.11 | 0.04 | 0.03 |
| EI 6-24 | I feel upset when I miss my exercise activities. | 0.26 | 0.09 | 0.19 | **-0.51** |
| SEG 8-25 | I set seasonal exercise goals. | **0.50** | 0.07 | 0.04 | 0.00 |
| EI 7-26 | I don't value exercise. | -0.19 | 0.12 | -0.11 | **0.55** |
| PAMTE 7-27 | I underestimate the time it takes to complete my exercise activities. | -0.12 | 0.11 | **0.59** | -0.12 |
| SEG 9-28 | I set challenging exercise goals. | **0.65** | -0.01 | 0.06 | -0.16 |
| ED 6-29 | I record my exercise sessions on a calendar. | 0.01 | **0.91** | -0.05 | 0.03 |
| EI 8-30 | I make exercise an important part of my life. | 0.12 | -0.11 | -0.08 | **-0.80** |

Table 49 continued

*Results of Exploratory Factor Analysis for Sample 1 (Principal Axis for Four Factors Followed by Oblimin, Δ =0; k=37)*

| Item # | Item Description | Factor | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| PAMTE 8-31 | I know how to prioritize my activities to include exercise. | 0.14 | 0.17 | -0.29 | **-0.56** |
| ED 7-32 | I document my exercise activities. | 0.16 | **0.83** | -0.10 | 0.05 |
| SEG 10-33 | I revise my exercise goals. | **0.74** | 0.20 | -0.07 | 0.11 |
| ED 8-34 | I check my "to do lists" frequently so I don't forget to exercise. | 0.03 | **0.74** | 0.13 | -0.05 |
| SEG 11-35* | I set exercise goals that are reasonable for me. | **0.75** | 0.01 | 0.12 | 0.05 |
| PAMTE 9-36* | I accurately estimate the amount of time it takes me to exercise. | **0.46** | 0.01 | -0.08 | -0.21 |
| PAMTE 10-37* | I prepare the things I need for my exercise activities ahead of time. | **0.48** | -0.15 | 0.04 | -0.22 |

*Note:* Bolded values indicate meaningful (i.e. $>|0.300|$) factor pattern coefficients. * indicates new test item.

This transformation yielded two items with pattern coefficients below the minimum $|0.30|$ criterion, 33 singlets, two doublets, and no triplets. After including only the higher pattern coefficients for the doublets (i.e. with items that load on two factors; one item, the *high* item, has a higher absolute coefficient than the other, the *low* item), 11 items loaded on Factor 1, eight items loaded on Factor 2, six items loaded on Factor 3, and 10 items loaded on Factor 4.

In order to identify a substantively meaningful solution, the factor pattern was re-examined by re-running the factor analysis after deleting the two items (PAMTE 1-1 &

PAMTE 3-12) that originally fell below the minimum loading criterion value of $|0.30|$ (see Table 50).

Table 50

*Results of Exploratory Factor Analysis for Sample 1 (Principal Axis for Four Factors Followed by Oblimin, Δ =0; k=35)*

| **Item #** | **Item Description** | **Factor** | | | |
|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** |
| EI 1-2 | Exercise is not a priority in my life. | 0.18 | 0.08 | -0.00 | **0.81** |
| SEG 1-3* | I set goals for my exercise participation and adherence. | 0.25 | 0.07 | 0.05 | **-0.40** |
| EI 2-4 | Finding the time to exercise is not important to me. | 0.02 | -0.03 | 0.02 | **0.64** |
| ED 1-5 | I check exercise off of my "to do list" when I finish exercising. | -0.06 | **0.45** | 0.23 | -0.26 |
| SEG 2-6 | I evaluate my exercise goals. | **0.47** | 0.23 | 0.08 | -0.19 |
| PAMTE 2-7 | I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | -0.19 | -0.01 | **0.50** | -0.10 |
| EI 3-8 | I reserve time in my daily schedule for exercise. | 0.17 | 0.16 | -0.05 | **-0.59** |
| ED 2-9 | I record the amount of time I spend exercising in a day-timer or on a calendar. | 0.02 | **0.78** | -0.10 | -0.05 |
| SEG 3-10* | I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | **0.62** | 0.17 | -0.09 | -0.11 |
| EI 4-11 | I feel stressed when I do not find the time to exercise. | 0.10 | 0.08 | 0.14 | **-0.57** |
| ED 3-13 | I write my exercise schedule down. | 0.23 | **0.67** | -0.08 | -0.05 |
| SEG 4-14 | My exercise goals are unclear. | -0.17 | -0.11 | **0.38** | **0.31** |

Table 50 continued

*Results of Exploratory Factor Analysis for Sample 1 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=35)*

| Item # | Item Description | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|---|
| EI 5-15 | Exercise is among my top priorities. | 0.11 | 0.11 | -0.04 | **-0.77** |
| PAMTE 4-16 | The exercise activities I enjoy are inconvenient because they take up too much time. | -0.10 | 0.14 | **0.48** | **0.31** |
| ED 4-17 | I use a day-timer to block out time for exercise. | -0.03 | **0.84** | -0.01 | -0.06 |
| SEG 5-18 | I set short term exercise goals for what I want to accomplish each week. | **0.40** | **0.37** | 0.06 | -0.05 |
| PAMTE 5-19 | I often miss-out on my exercise activities because I am over-committed. | 0.02 | -0.14 | **0.60** | 0.05 |
| SEG 6-20 | I don't set long term exercise goals. | **-0.42** | -0.03 | 0.24 | 0.18 |
| PAMTE 6-21 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | 0.19 | -0.14 | **0.55** | -0.12 |
| ED 5-22 | I keep an exercise log or diary. | 0.23 | **0.60** | -0.10 | 0.02 |
| SEG 7-23 | I set short term exercise goals. | **0.70** | 0.12 | 0.03 | 0.02 |
| EI 6-24 | I feel upset when I miss my exercise activities. | 0.22 | 0.10 | 0.19 | **-0.52** |
| SEG 8-25 | I set seasonal exercise goals. | **0.51** | 0.07 | 0.03 | 0.00 |
| EI 7-26 | I don't value exercise. | -0.19 | 0.12 | -0.11 | **0.54** |
| PAMTE 7-27 | I underestimate the time it takes to complete my exercise activities. | -0.09 | 0.10 | **0.57** | -0.10 |
| SEG 9-28 | I set challenging exercise goals. | **0.63** | -0.01 | 0.06 | -0.17 |
| ED 6-29 | I record my exercise sessions on a calendar. | 0.01 | **0.91** | -0.05 | 0.03 |
| EI 8-30 | I make exercise an important part of my life. | 0.10 | -0.10 | -0.09 | **-0.81** |

Table 50 continued

*Results of Exploratory Factor Analysis for Sample 1 (Principal Axis for Four Factors Followed by Oblimin, Δ =0; k=35)*

| **Item #** | **Item Description** | **Factor** | | | |
|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** |
| PAMTE 8-31 | I know how to prioritize my activities to include exercise. | 0.15 | 0.16 | -0.29 | **-0.55** |
| ED 7-32 | I document my exercise activities. | 0.15 | **0.84** | -0.09 | 0.04 |
| SEG 10-33 | I revise my exercise goals. | **0.74** | 0.22 | -0.06 | 0.10 |
| ED 8-34 | I check my "to do lists" frequently so I don't forget to exercise. | 0.03 | **0.75** | 0.13 | -0.04 |
| SEG 11-35* | I set exercise goals that are reasonable for me. | **0.76** | 0.01 | 0.12 | 0.06 |
| PAMTE 9-36* | I accurately estimate the amount of time it takes me to exercise. | **0.46** | 0.00 | -0.08 | -0.20 |
| PAMTE 10-37* | I prepare the things I need for my exercise activities ahead of time. | **0.49** | -0.01 | 0.05 | -0.20 |

*Note:* Bolded values indicate meaningful (i.e. $>|0.300|$) factor pattern coefficients. * indicates field test item.

The results of this second analysis showed zero pattern coefficients below $|0.30|$, 32 singlets, three doublets, and no triplets. The lower pattern coefficient for two of the doublets equaled 0.31 when rounded to two decimal places (0.305 for each item). The remaining doublet had low pattern coefficient values on both factors (0.400 for Factor 1 and 0.371 for Factor 2) but was assigned to Factor 1 due to the higher pattern coefficient.

Of the 11 items loading on Factor 1, nine items were originally written for the SEG (81.8%) subscale. Seven of these SEG items were original items and two were new items. The remaining two items were also new items but were written for the PAMTE subscale. Factor 2 appeared to be the ED subscale, consisting of nine items overall, of which eight (88.9%) were originally written for the ED subscale. One item (SEG 5-18) loaded on both Factor 1 and Factor 2 but with a higher absolute pattern coefficient value on Factor 1. Thus, due to statistical and substantive reasons, SEG 5-18 was assigned to Factor 1. Similarly, five of the six items (83.3%) loading on Factor 3 were originally written for the PAMTE subscale with the remaining item written for the SEG subscale (SEG 4-14). The fourth factor consisted of 12 items and appeared to be the EI subscale. All eight items originally written for the EI subscale were part of this factor. The remaining items consisted of two PAMTE items (PAMTE 4-16 and PAMTE 8-31) and two SEG items (SEG 1-3 (new item) and SEG 4-14). Of these items, two (SEG 4-14 and PAMTE 4-16) also loaded on Factor 3 with higher absolute values, and were assigned to Factor 3. The correlations among the four factors ranged from -0.18 to 0.46.

*Sample 1 summary of the exploratory factor analysis results.* The best fitting solution for sample 1 was for a 35-item version of the TIMES. Principal axis extraction followed by oblimin transformation with delta set equal to zero yielded four correlated and interpretable factors accounting for a total of 58.2% of the variance. Factor 1 (11 items) appeared to be the SEG subscale accounting for 37.9% of the variance, Factor 2 (8 items) appeared to be the ED subscale accounting for 8.5% of the variance, Factor 3 (6 items) appeared to be the PAMTE subscale accounting for 7.2% of the variance, and Factor 4 (10 items) appeared to be the EI subscale accounting for 4.6% of the variance.

### *Sample 1 Item Analysis (k=35) Results*

Based on the factor analytic results, item and subscale analyses were conducted on the new 35-item four subscale structure (see Appendix K). Table 51 presents a summary of the item analysis for sample 1. Three of the subscales (SEG, ED, and EI)

Table 51

*Summary Results of Item Analysis for Sample 1 (k=35)*

| Subscale | *M* Scale | *SD* of Scale | *R* of Item Means | *R* of Item-subscale $r_{xx}$ | Internal Consistency |
|---|---|---|---|---|---|
| SEG | 19.3 | 10.6 | 1.1-2.4 | .51-.75 | 0.90 |
| ED | 6.4 | 7.6 | 0.6-1.1 | .50-.84 | 0.92 |
| PAMTE | 12.7 | 4.9 | 1.6-2.7 | .27-.45 | 0.67 |
| EI | 23.8 | 9.6 | 1.9-3.4 | .58-.84 | 0.91 |

*Note.* SEG refers to Setting Exercise Goals. ED refers to Exercise Documentation. PAMTE refers to Perceived Ability to manage Time for Exercise. EI refers to Exercise Importance.

had high internal consistency values with coefficients ranging from 0.90 to 0.91. In comparison, the coefficient alpha for Factor 3 (PAMTE) was low.

### *Summary of Sample 1 Analyses*

The hypothesized four factor solutions for the TIMES with $k = 37$ and $k = 32$ were not confirmed using confirmatory factor analysis. However, exploratory factor analyses yielded an interpretable four factor solution for a 35-item version of the TIMES. Item analysis of this factor pattern resulted in three subscales with high internal consistency (EI, SEG, and ED) and one subscale (PAMTE) with marginal internal consistency.

### *Sample 2 Confirmatory Factor Analysis Results*

Results of the confirmatory factor analysis of the 37 items included in the second draft of the TIMES revealed that the four factor correlated model did not fit (see Table 52).

Table 52

*Results of Confirmatory Factor Analysis ($n_2 = 205$; $k=37$)*

| Index of Fit | Index Value | Criterion to Fit | Fit/No Fit |
|---|---|---|---|
| Chi-Square | 1417.71 (df =6 23) $p = 0.0$ | Statistically Nonsignificant[a] | No Fit |
| $\chi^2$/df | 2.28 | 2.0 or Less[b] | No Fit |
| RMSEA | 0.079 | 0.08 or Less[c] | Fit |
| RMR | 0.088 | 0.05 or Less[a] | No Fit |
| AGFI | 0.67 | 0.95 or More[a] | No Fit |

*Note:* [a] reference from Hayduck, 1996; [b] reference from Marsh et al., 1988; [c] reference from Browne & Cudek, 1993.

In view of the fact that the original four factor model of the TIMES was based on the 32-item TIMES (without the new items), confirmatory factor analysis was also conducted with $k = 32$. Results of the confirmatory factor analysis showed that the 32-item model did not fit the data either (see Table 53).

Table 53

*Results of Confirmatory Factor Analysis ($n_2 = 205$; $k=32$)*

| Index of Fit | Index Value | Criterion to Fit | Fit/No Fit |
|---|---|---|---|
| Chi-Square | 1045.12 (df = 458) $p = 0.0$ | Statistically Nonsignificant[a] | No Fit |
| $\chi^2$/df | 2.28 | 2.0 or Less[b] | No Fit |
| RMSEA | 0.079 | 0.08 or Less[c] | Fit |
| RMR | 0.093 | 0.05 or Less[a] | No Fit |
| AGFI | 0.70 | 0.95 or More[a] | No Fit |

*Note:* [a] reference from Hayduck, 1996; [b] reference from Marsh et al., 1988; [c] reference from Browne & Cudek, 1993.

Through the use of the data from the first subsample and exploratory factor analysis, a different four factor structure emerged for a revision of the second draft of the TIMES (35-item version). However, the results of the confirmatory factor analysis procedures again revealed that the results were not replicated (see Table 54). Therefore, as with subsample 1, exploratory factor analyses were replicated to determine the underlying structure of the second draft of the TIMES in the second subsample.

Table 54

*Results of Confirmatory Factor Analysis ($n_2 = 205; k=35$)*

| Index of Fit | Index Value | Criterion to Fit | Fit/No Fit |
|---|---|---|---|
| Chi-Square | 1292.38 (df = 554) $p = 0.0$ | Statistically Nonsignificant[a] | No Fit |
| $\chi^2$/df | 2.33 | 2.0 or Less[b] | No Fit |
| RMSEA | 0.081 | 0.08 or Less[c] | No Fit |
| RMR | 0.11 | 0.05 or Less[a] | No Fit |
| AGFI | 0.73 | 0.95 or More[a] | No Fit |

*Note:* [a] reference from Hayduck, 1996; [b] reference from Marsh et al., 1988; [c] reference from Browne & Cudek, 1993.

### *Sample 2 Exploratory Factor Analysis Results*

*Sample 2 factor extraction results.* Eight factors were identified with eigenvalues great than one, accounting for 65.5% of the variance. Cattell's (1966) Scree plot criteria identified 4 factors (see Figure 7). Results of the image extraction followed by varimax rotation (Kaiser, 1962) identified 7 factors. Thus, the number of factors identified by the three procedures differed between sample 2 (range = 4 to 8) and sample 1 (range = 3 to 6). Subsequent factor rotations and transformations for sample 2 were conducted for 3 through 8 factors inclusive.

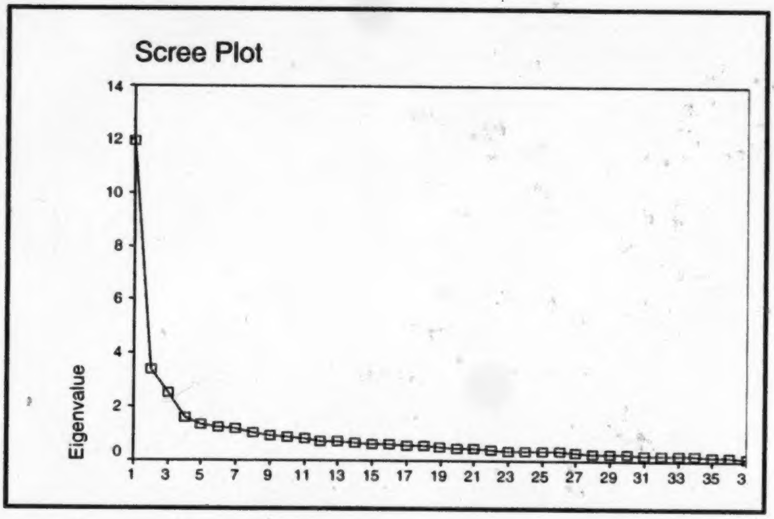

*Figure 7.* Scree plot identifying 4 factors (Second empirical field test, second sample).

*Sample 2 results of factor rotations and transformations.* As for sample 1, the best fitting solution for sample 2 was a principal axis extraction for 4 factors followed by oblimin transformation with delta set equal to zero (see Table 55).

Table 55

*Results of Exploratory Factor Analysis for Sample 2 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=37)*

| Item | | Factor | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| PAMTE 1-1 | I lack the time to exercise because I am disorganized. | 0.20 | 0.09 | -0.29 | -0.04 |
| EI 1-2 | Exercise is not a priority in my life. | **0.60** | 0.03 | -0.03 | -0.04 |
| SEG 1-3* | I set goals for my exercise participation and adherence. | **0.50** | -0.12 | -0.02 | **-0.35** |
| EI 2-4 | Finding the time to exercise is not important to me. | **0.52** | -0.01 | -0.13 | -0.06 |
| ED 1-5 | I check exercise off of my "to do list" when I finish exercising. | 0.21 | **0.56** | 0.01 | 0.10 |
| SEG 2-6 | I evaluate my exercise goals. | 0.23 | 0.18 | 0.03 | **-0.60** |
| PAMTE 2-7 | I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | -0.06 | 0.06 | **0.58** | 0.18 |
| EI 3-8 | I reserve time in my daily schedule for exercise. | **0.59** | 0.08 | 0.28 | -0.18 |
| ED 2-9 | I record the amount of time I spend exercising in a day-timer or on a calendar. | -0.12 | **0.83** | -0.00 | -0.07 |
| SEG 3-10* | I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | **0.33** | 0.22 | 0.01 | **-0.45** |
| EI 4-11 | I feel stressed when I do not find the time to exercise. | **0.60** | 0.10 | -0.14 | -0.06 |
| PAMTE 3-12 | I am never late for my exercise activities. | **0.30** | 0.21 | 0.14 | -0.04 |
| ED 3-13 | I write my exercise schedule down. | -0.06 | **0.67** | -0.01 | -0.20 |
| SEG 4-14 | My exercise goals are unclear. | 0.28 | -0.05 | 0.24 | **-0.42** |

Table 55 continued

*Results of Exploratory Factor Analysis for Sample 2 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=37)*

| | Item | Factor | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| EI 5-15 | Exercise is among my top priorities. | **0.73** | -0.01 | 0.18 | -0.19 |
| PAMTE 4-16 | The exercise activities I enjoy are inconvenient because they take up too much time. | 0.16 | 0.04 | **0.53** | 0.02 |
| ED 4-17 | I use a day-timer to block out time for exercise. | 0.09 | **0.62** | 0.00 | -0.09 |
| SEG 5-18 | I set short term exercise goals for what I want to accomplish each week. | 0.00 | 0.26 | -0.15 | **-0.54** |
| PAMTE 5-19 | I often miss-out on my exercise activities because I am over-committed. | 0.04 | 0.01 | **0.65** | 0.04 |
| SEG 6-20 | I don't set long term exercise goals. | 0.18 | -0.07 | 0.08 | **-0.48** |
| PAMTE 6-21 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | -0.27 | -0.05 | **0.39** | -0.15 |
| ED 5-22 | I keep an exercise log or diary. | -0.07 | **0.71** | 0.08 | -0.14 |
| SEG 7-23 | I set short term exercise goals. | 0.15 | 0.17 | -0.01 | **-0.58** |
| EI 6-24 | I feel upset when I miss my exercise activities. | **0.68** | 0.13 | -0.17 | -0.08 |
| SEG 8-25 | I set seasonal exercise goals. | 0.13 | **0.32** | -0.19 | -0.27 |
| EI 7-26 | I don't value exercise. | **0.56** | 0.01 | -0.16 | 0.02 |
| PAMTE 7-27 | I underestimate the time it takes to complete my exercise activities. | -0.11 | -0.03 | **0.36** | -0.07 |
| SEG 9-28 | I set challenging exercise goals. | **0.43** | -0.00 | 0.05 | **-0.40** |
| ED 6-29 | I record my exercise sessions on a calendar. | -0.13 | **0.86** | -0.09 | -0.07 |

Table 55 continued

*Results of Exploratory Factor Analysis for Sample 2 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=37)*

| Item | | Factor | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| EI 8-30 | I make exercise an important part of my life. | **0.81** | -0.02 | 0.19 | -0.09 |
| PAMTE 8-31 | I know how to prioritize my activities to include exercise. | **0.58** | 0.09 | **0.39** | -0.09 |
| ED 7-32 | I document my exercise activities. | -0.15 | **0.83** | 0.05 | -0.19 |
| SEG 10-33 | I revise my exercise goals. | 0.07 | 0.21 | 0.03 | **-0.63** |
| ED 8-34 | I check my "to do lists" frequently so I don't forget to exercise. | 0.18 | **0.65** | 0.01 | 0.22 |
| SEG 11-35* | I set exercise goals that are reasonable for me. | **0.43** | 0.11 | -0.21 | **-0.38** |
| PAMTE 9-36* | I accurately estimate the amount of time it takes me to exercise. | **0.41** | 0.16 | 0.09 | -0.20 |
| PAMTE 10-37* | I prepare the things I need for my exercise activities ahead of time. | **0.50** | 0.15 | 0.03 | -0.07 |

*Note:* Bolded values indicate meaningful (i.e. >$|0.300|$) factor pattern coefficients. * indicates field test item.

This transformation yielded one item with pattern coefficients below the minimum $|0.30|$ criterion, one item with a pattern coefficient at 0.30 (0.303), 31 singlets, four doublets, and no triplets. After including only the higher pattern coefficients for the doublets, 15 items loaded on Factor 1, nine items loaded on Factor 2, five items loaded on Factor 3, and seven items loaded on Factor 4. In order to identify a substantively meaningful solution, the factor pattern was re-examined by re-running the factor analysis after deleting the item that originally fell below the minimum loading criterion value of $|0.30|$ and the item with the factor loading meeting the criteria by just 0.003 (see Table

56). The two items removed from sample 2 (PAMTE 1-1 and PAMTE 3-12) were the same items removed in the initial analyses of the sample 1 data.

Table 56

*Results of Exploratory Factor Analysis for Sample 2 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=35)*

| | **Item** | **Factor** | | | |
|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** |
| EI 1-2 | Exercise is not a priority in my life. | **0.61** | 0.04 | -0.03 | -0.01 |
| SEG 1-3* | I set goals for my exercise participation and adherence. | **0.53** | -0.12 | -0.02 | **-0.33** |
| EI 2-4 | Finding the time to exercise is not important to me. | **0.53** | -0.09 | -0.13 | -0.03 |
| ED 1-5 | I check exercise off of my "to do list" when I finish exercising. | 0.22 | **0.56** | 0.02 | 0.12 |
| SEG 2-6 | I evaluate my exercise goals. | 0.27 | 0.14 | 0.02 | **-0.58** |
| PAMTE 2-7 | I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | -0.03 | 0.08 | **0.59** | 0.18 |
| EI 3-8 | I reserve time in my daily schedule for exercise. | **0.62** | 0.10 | 0.29 | -0.15 |
| ED 2-9 | I record the amount of time I spend exercising in a day-timer or on a calendar. | -0.12 | **0.83** | -0.00 | -0.6 |
| SEG 3-10* | I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | **0.36** | 0.23 | 0.03 | **-0.38** |
| EI 4-11 | I feel stressed when I do not find the time to exercise. | **0.61** | 0.09 | -0.13 | -0.05 |
| ED 3-13 | I write my exercise schedule down. | -0.06 | **0.67** | -0.02 | -0.20 |

Table 56 continued

*Results of Exploratory Factor Analysis for Sample 2 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=35)*

| | **Item** | **Factor** | | | |
|---|---|---|---|---|---|
| | | **1** | **2** | **3** | **4** |
| SEG 4-14 | My exercise goals are unclear. | 0.30 | -0.04 | 0.21 | **-0.42** |
| EI 5-15 | Exercise is among my top priorities. | **0.75** | 0.00 | 0.19 | -0.16 |
| PAMTE 4-16 | The exercise activities I enjoy are inconvenient because they take up too much time. | 0.20 | 0.06 | **0.55** | 0.03 |
| ED 4-17 | I use a day-timer to block out time for exercise. | 0.08 | **0.62** | 0.00 | 0.08 |
| SEG 5-18 | I set short term exercise goals for what I want to accomplish each week. | 0.02 | 0.26 | -0.17 | **-0.53** |
| PAMTE 5-19 | I often miss-out on my exercise activities because I am over-committed. | 0.06 | 0.01 | **0.64** | 0.03 |
| SEG 6-20 | I don't set long term exercise goals. | 0.20 | -0.06 | 0.07 | **-0.47** |
| PAMTE 6-21 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | -0.26 | -0.04 | **0.39** | -0.17 |
| ED 5-22 | I keep an exercise log or diary. | -0.05 | **0.72** | 0.09 | -0.12 |
| SEG 7-23 | I set short term exercise goals. | 0.17 | 0.18 | -0.02 | **-0.56** |
| EI 6-24 | I feel upset when I miss my exercise activities. | **0.69** | 0.13 | -0.16 | 0.05 |
| SEG 8-25 | I set seasonal exercise goals. | 0.14 | **0.32** | -0.18 | -0.25 |
| EI 7-26 | I don't value exercise. | **0.57** | 0.01 | -0.10 | 0.05 |
| PAMTE 7-27 | I underestimate the time it takes to complete my exercise activities. | -0.09 | -0.02 | **0.36** | -0.07 |
| SEG 9-28 | I set challenging exercise goals. | **0.46** | 0.00 | 0.05 | **-0.38** |
| ED 6-29 | I record my exercise sessions on a calendar. | -0.12 | **0.86** | -0.09 | -0.05 |

Table 56 continued

*Results of Exploratory Factor Analysis for Sample 2 (Principal Axis for Four Factors Followed by Oblimin, Δ =0, k=35)*

| Item | | Factor | | | |
|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 |
| EI 8-30 | I make exercise an important part of my life. | **0.84** | -0.01 | 0.20 | -0.00 |
| PAMTE 8-31 | I know how to prioritize my activities to include exercise. | **0.58** | 0.09 | **0.36** | -0.06 |
| ED 7-32 | I document my exercise activities. | -0.13 | **0.84** | 0.06 | -0.17 |
| SEG 10-33 | I revise my exercise goals. | 0.10 | 0.22 | 0.02 | **-0.61** |
| ED 8-34 | I check my "to do lists" frequently so I don't forget to exercise. | 0.17 | **0.64** | 0.10 | 0.20 |
| SEG 11-35* | I set exercise goals that are reasonable for me. | **0.45** | 0.12 | -0.03 | **-0.36** |
| PAMTE 9-36* | I accurately estimate the amount of time it takes me to exercise. | **0.42** | 0.17 | 0.09 | -0.19 |
| PAMTE 10-37* | I prepare the things I need for my exercise activities ahead of time. | **0.48** | 0.14 | 0.01 | -0.08 |

*Note:* Bolded values indicate meaningful (i.e. >$|0.300|$) factor pattern coefficients. * indicates field test item.

The factor analyses of the remaining 35 items yielded four factors with no pattern coefficients below $|0.30|$, 30 singlets, five doublets, and zero triplets. Of the 16 items loading on Factor 1, eight items were originally written for the EI subscale. Thus, it appeared as if Factor 1 may represent EI. Four of the remaining eight items were written for the SEG subscales (1-3, 3-10, 9-28, and 11-35) and four items were written for the PAMTE subscales (2-7, 8-31, 9-36, and 10-37). One of the SEG items (3-10) had a higher absolute pattern coefficient on Factor 4 and was thus assigned to that factor. Similarly, one of the PAMTE items (2-7) had a higher absolute pattern coefficient value on Factor 3 and so was assigned there. Two additional SEG items were new field test items (1-3 and 11-35). Two of the three PAMTE items (9-36 and 10-37) fitting Factor 1 were also new field test items. Half of the items that were not hypothesized to fit Factor 1 but did, were field test items. In total, EI appeared to consist of 14 items.

Factor 2 appeared to be the ED subscale, consisting of nine items overall, of which eight items (88.9%) were originally written for the ED subscale. The remaining SEG item (8-25) only marginally loaded on Factor 2 (0.317). All five of the items loading on Factor 3 were originally written for the PAMTE subscale and thus Factor 3 was identified as the PAMTE subscale. The fourth factor consisted of ten items and appeared to be the SEG subscale. Seven items (70.0%) originally written for the SEG subscale fit Factor 4. Three additional SEG items (1-3, 9-28, and 11-35) fit Factor 4 but also loaded with higher absolute values on Factor 1. Thus, Factor 4 appeared to consist of seven items. The correlations among the factors ranged from -.18 to .46 and were identical to the correlations calculated in sample 1.

*Sample 2 summary of the exploratory factor analysis results.* As for the sample 1 analyses, the hypothesized four factor solution for the TIMES with $k = 37$ and $k = 32$ were not confirmed using confirmatory factor analysis. Exploratory factor analysis yielded a four factor solution with the same 35-item version of the TIMES. Principal axis extraction followed by oblimin transformation with delta set equal to zero yielded four correlated and interpretable factors accounting for a total of 57.9% of the variance. After allowing for only the higher pattern coefficients of the items that loaded on two factors, Factor 1 (14 items) appeared to be the EI subscale (37.3% of the variance), Factor 2 (9 items) appeared to be the ED subscale (9.2% of the variance), Factor 3 (5 items) appeared to be the PAMTE subscale (7.3% of the variance), and Factor 4 (7 items) appeared to be the SEG subscale (4.1% of the variance).

*Sample 2 Item Analysis (k=35) Results*

Based on the factor analytic results of the data from the second sample, item and subscale analyses were conducted on the 35-item four subscale structure (see Appendix L). Table 57 presents a summary of the item analysis for sample 2.

Table 57

*Summary Results of Item Analysis for Sample 2 (k=35)*

| Subscale | *M* Scale | *SD* of Scale | *R* of Item Means | *R* of Item-subscale $r_{xx}$ | Internal Consistency |
|---|---|---|---|---|---|
| SEG | 19.3 | 10.6 | 1.1-2.4 | .51-.75 | 0.90 |
| ED | 9.0 | 8.6 | 0.7-1.6 | .49-.81 | 0.90 |
| PAMTE | 10.4 | 4.5 | 1.5-2.5 | .36-.53 | 0.68 |
| EI | 31.7 | 13.7 | 1.9-3.3 | .59-.85 | 0.94 |

*Note.* SEG refers to Setting Exercise Goals. ED refers to Exercise Documentation. PAMTE refers to Perceived Ability to manage Time for Exercise. EI refers to Exercise Importance.

Three of the subscales (SEG, ED, and EID) had high internal consistency values equal to or above 0.90. In comparison, the coefficient alpha for Factor 3 (PAMTE) was low. This result is similar to that found with Sample 1.

*Comparison Between the Factor Patterns for Sample 1 and Sample 2*

The first and fourth factors of sample 1 correspond, respectively to the fourth and first factors of sample 2. Consequently, Factors 1 and 4 were transposed in sample 2. With this change and as shown in Table 58, the two solutions were similar.

Table 58

*Comparison Between the Factor Patterns for Sample 1 and Sample 2*

| | Sample 1 | | | | Sample 2 | | | |
|---|---|---|---|---|---|---|---|---|
| **Subscale** | **SG** | **ED** | **PA** | **EI** | **SG** | **ED** | **PA** | **EI** |
| **Exercise Importance** | | | | | | | | |
| **EI 1-2. Exercise is not a priority in my life.** | | | | √ | | | | √ |
| **EI 2-4. Finding the time to exercise is not important to me.** | | | | √ | | | | √ |
| **EI 3-8. I reserve time in my daily schedule for exercise.** | | | | √ | | | | √ |
| **EI 4-11. I feel stressed when I do not find the time to exercise.** | | | | √ | | | | √ |
| **EI 5-15. Exercise is among my top priorities.** | | | | √ | | | | √ |
| **EI 6-24. I feel upset when I miss my exercise activities.** | | | | √ | | | | √ |
| **EI 7-26. I don't value exercise.** | | | | √ | | | | √ |
| **EI 8-30. I make exercise an important part of my life.** | | | | √ | | | | √ |
| SEG 1-3*. I set goals for my exercise participation and adherence. | | | | √ | + | | | √ |
| SEG 3-10*. I set specific exercise goals (e.g., I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g., I am going to start exercising more often). | √ | | | | √ | | | + |
| SEG 4-14. My exercise goals are unclear. | | | √ | + | √ | | | |
| SEG 9-28. I set challenging exercise goals. | √ | | | | + | | | √ |
| SEG 11-35*. I set exercise goals that are reasonable for me. | √ | | | | + | | | √ |
| PAMTE 2-7. I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | | | √ | | + | | √ | |
| PAMTE 4-16. The exercise activities I enjoy are inconvenient because they take up too much time. | | | √ | + | | | √ | |
| PAMTE 8-31. I know how to prioritize my activities to include exercise. | | | | √ | | | + | √ |
| PAMTE 9-36*. I accurately estimate the amount of time it takes me to exercise. | √ | | | | | | | √ |
| PAMTE 10-37*. I prepare the things I need for my exercise activities ahead of time. | √ | | | | | | | √ |

Table 58 continued

*Comparison Between the Factor Patterns for Sample 1 and Sample 2*

| | Sample 1 | | | | Sample 2 | | | |
|---|---|---|---|---|---|---|---|---|
| Subscale | SG | ED | PA | EI | SG | ED | PA | EI |
| **Exercise Documentation** | | | | | | | | |
| **ED 1-5. I check exercise off of my "to do list" when I finish exercising.** | | √ | | | | √ | | |
| **ED 2-9. I record the amount of time I spend exercising in a day-timer or on a calendar.** | | √ | | | | √ | | |
| **ED 3-13. I write my exercise schedule down.** | | √ | | | | √ | | |
| **ED 4-17. I use a day-timer to block out time for exercise.** | | √ | | | | √ | | |
| **ED 5-22. I keep an exercise log or diary.** | | √ | | | | √ | | |
| **ED 6-29. I record my exercise sessions on a calendar.** | | √ | | | | √ | | |
| **ED 7-32. I document my exercise activities.** | | √ | | | | √ | | |
| **ED 8-34. I check my "to do lists" frequently so I don't forget to exercise.** | | √ | | | | √ | | |
| SEG 5-18. I set short term exercise goals for what I want to accomplish each week. | √ | + | | | √ | | | |
| SEG 8-25. I set seasonal exercise goals. | √ | | | | | √ | | |

Table 58 continued

*Comparison Between the Factor Patterns for Sample 1 and Sample 2*

| | **Sample 1** | | | | **Sample 2** | | | |
|---|---|---|---|---|---|---|---|---|
| **Subscale** | **SG** | **ED** | **PA** | **EI** | **SG** | **ED** | **PA** | **EI** |
| **Setting Exercise Goals** | | | | | | | | |
| **SEG 2-6. I evaluate my exercise goals.** | √ | | | | √ | | | |
| **SEG 3-10*. I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often).** | √ | | | | √ | | | + |
| **SEG 5-18. I set short term exercise goals for what I want to accomplish each week.** | √ | + | | | √ | | | |
| **SEG 6-20. I don't set long term exercise goals.** | √ | | | | √ | | | |
| **SEG 7-23. I set short term exercise goals.** | √ | | | | √ | | | |
| **SEG 9-28. I set challenging exercise goals.** | √ | | | | + | | | √ |
| **SEG 10-33. I revise my exercise goals.** | √ | | | | √ | | | |
| **SEG 11-35*. I set exercise goals that are reasonable for me.** | √ | | | | + | | | √ |
| SEG 1-3*. I set goals for my exercise participation and adherence. | | | | √ | + | | | √ |
| SEG 4-14. My exercise goals are unclear. | | | √ | + | √ | | | |
| SEG 8-25. I set seasonal exercise goals. | √ | | | | | √ | | |
| PAMTE 9-36. I accurately estimate the amount of time it takes me to exercise. | √ | | | | | | | √ |
| PAMTE 10-37. I prepare the things I need for my exercise activities ahead of time. | √ | | | | | | | √ |

Table 58 continued

*Comparison Between the Factor Patterns for Sample 1 and Sample 2*

| | **Sample 1** | | | | **Sample 2** | | | |
|---|---|---|---|---|---|---|---|---|
| | **SG** | **ED** | **PA** | **EI** | **SG** | **ED** | **PA** | **EI** |
| **Perceived Ability to Manage Time for Exercise** | | | | | | | | |
| **PAMTE 2-7. I find it difficult to reschedule my exercise when I can't exercise at my scheduled time.** | | | √ | | | | √ | + |
| **PAMTE 4-16. The exercise activities I enjoy are inconvenient because they take up too much time.** | | | √ | + | | | √ | |
| **PAMTE 5-19. I often miss-out on my exercise activities because I am over-committed.** | | | √ | | | | √ | |
| **PAMTE 6-21. When I am very busy, I reallocate the time I set aside for exercise in order to do something else.** | | | √ | | | | √ | |
| **PAMTE 7-27. I underestimate the time it takes to complete my exercise activities.** | | | √ | | | | √ | |
| PAMTE 8-31. I know how to prioritize my activities to include exercise. | | | | √ | | | + | √ |
| SEG 4-14. My exercise goals are unclear. | | | √ | + | √ | | | |

*Note:* SG refers to Setting Exercise Goals. ED refers to Exercise Documentation. PA refers to Perceived Ability to Manage Time for Exercise. EI refers to Exercise Importance. Items in bold represent items tentatively selected for final draft of the TIMES. √ refers to items fitting factor. + refers to meaningful pattern coefficients which are the lower values of items with double loadings. * refers to field test items.

*Factor 1 (Exercise Importance).* Across the two subsamples, 16 items loaded on Factor 1. All eight items originally written for the EI subscale loaded on Factor 1 for both subsamples. Although an additional two items (SEG 1-3* and PAMTE 8-31) loaded on Factor 1 for both subsamples, neither item substantively fit with the eight EI items. In addition to an association with Factor 1, two other items (SEG 4-14 and PAMTE 4-16) were associated with another factor, and were thus assigned to the other factors. Furthermore, there was a lack of agreement between the subsamples regarding the placement of an additional four new items (SEG 9-28, SEG 11-35*, PAMTE 9-36*, and PAMTE 10-37*). By including only the items that match the factor patterns of both subsamples and that were written for the EI factor, Factor 1 consisted of eight EI items.

*Factor 2 (Exercise Documentation).* The ED factor of both subsamples contained the original eight hypothesized ED items and one SEG item. However, the SEG item associated with Factor 2 was not the same for both subsamples. For subsample 1, the SEG item (5-18) loaded on both the SEG and ED factors but had a larger pattern coefficient with the SEG subscale and thus was analyzed with the SEG items. For subsample 2, the pattern coefficient of the SEG item (8-25) was larger for the factor associated with ED. Subsequent internal consistency calculations of the ED scale improved with the deletion of this item from Factor 2 and substantive argument also supported the removal of this item. By including only the items that match the factor patterns of both subsamples, Factor 2 was found to consist of eight ED items.

*Factor 3 (Setting Exercise Goals).* Across both subsamples, 13 items loaded on the factor associated with Setting Exercise Goals. For both subsamples, seven original SEG items and one new SEG item, fit the factors associated with SEG. However, for subsample 2, two of the original items associated with SEG were doublets with the lower absolute coefficients on the SEG factor. There was a lack of agreement between the samples regarding the placement of the remaining five items. By including only the items that match the factor patterns of both subsamples, Factor 3 was found to consist of eight SEG items.

*Factor 4 (Perceived Ability to Manage Time for Exercise).* For subsample 1, five of the original PAMTE items along with one additional SEG item (4-14) loaded significantly on the factor associated with PAMTE. In comparison, only the five items originally written for the PAMTE subscale loaded significantly on the corresponding factor for subsample 2. By including only the items that match the factor patterns of both subsamples, Factor 4 was found to consist of five PAMTE items.

*Statistical analysis of the combined samples.* Following the separate analyses, a MANOVA was conducted using the TIMES items as dependent variables and sample as the grouping variable in order to determine whether the data could be combined for further analysis. Box's M test of equality of covariance matrices was examined and results indicated that despite enormous degrees of freedom, no statistically significant differences were found ($F = 1.12$; $p = .049$; $df_1 = 435$; $df_2 = 498907$). According to Box's M, the two samples could be safely combined for further analysis.

### *Confirmatory Factor Analysis Results of Total Sample (k=29)*

Confirmatory factor analysis of the 29-item TIMES was conducted on the total sample to determine whether replication was possible. Despite the replication of the exploratory factor analysis results across both subsamples, confirmatory factor analysis results showed that the 29-item, four factor correlated model did not fit the total sample (see Table 59).

Table 59

*Results of Confirmatory Factor Analysis (N = 430; k = 29)*

| Index of Fit | Index Value | Criterion to Fit | Fit/No Fit |
|---|---|---|---|
| Chi-Square | 1666.91 (df = 371) $p = 0.0$ | Statistically Nonsignificant[a] | No Fit |
| $\chi^2$/df | 4.49 | 2.0 or Less[b] | No Fit |
| RMSEA | 0.093 | 0.08 or Less[c] | No Fit |
| RMR | 0.19 | 0.05 or Less[a] | No Fit |
| AGFI | 0.71 | 0.95 or More[a] | No Fit |

*Note:* [a] reference from Hayduck, 1996; [b] reference from Marsh et al., 1988; [c] reference from Browne & Cudek, 1993.

One possible explanation for the lack of correspondence between the results from the exploratory and confirmatory factor analyses is that that the two techniques may not be fully comparable (Van Prooijen & Van Der Kloot, 2001). Exploratory factor analysis is primarily a data-driven technique and all variables included in the analysis are free to load on all factors (Gorsuch, 1983). In comparison, confirmatory factor analysis tends to be a theory-driven technique and not all variables are free to load on all factors (Bollen, 1989). Confirmatory factor analysis typically has more restrictions than exploratory factor analysis and is considered a more conservative procedure (Van Prooijen & Van Der Kloot, 2001). In this study, the factor pattern coefficients that were considered *insignificant* (i.e., below the criterion of meaningfulness set to $|0.30|$) in the original exploratory factor analysis were fixed to zero in the confirmatory factor analysis. Thus, the number of parameters that were constrained in the confirmatory factor analysis increased. It is possible that the conservativeness of the confirmatory factor analysis procedure was responsible for the lack of fit of the exploratory model.

### *Third Draft of the TIMES*

*Results of the exploratory factor analysis of the complete sample.* An exploratory factor analysis of the third edition of the TIMES was completed using the full sample of 430 participants. After extracting four factors accounting for 60.8% of the variance, a principal axis analysis followed by a direct oblimin transformation (Carroll, 1957) with delta set equal to 0 was conducted. Results demonstrated a factor pattern portraying parsimony, almost pure simple structure, and salient loadings. Twenty-eight of the 29 pattern coefficients were singlets with the remaining item loading on both Factor 4 and Factor 2. The lower pattern coefficient for the doublet item, (PAMTE 4-16) was small (0.327) and negligible when compared to the singlet pattern coefficient values which were all greater than 0.465 (see Table 60). Consequently, the PAMTE 4-16 item was assigned to Factor 2.

Table 60

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation ($\Delta$ =0; $k$ =29; $N$ = 430)*

| # | Item | Item Description | Factor | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| Subscale Definition | | Exercise Importance: Focused commitment to exercise, making exercise a priority in life, acknowledgement of the importance of exercise, and feelings of anxiety and stress over lack of time for exercise. | | | | |
| 1 | EI 1-2<br>(EP 1-3) | Exercise is not a priority in my life. | .067 | .018 | -.099 | **.764** |
| 2 | EI 2-4<br>(EP 2-6) | Finding the time to exercise is not important to me. | .049 | -.028 | .027 | **.635** |
| 3 | EI 3-8<br>(SE 3-11) | I reserve time in my daily schedule for exercise. | .188 | .083 | -.167 | **.587** |
| 4 | EI 4-11<br>(ETMPE 4-32) | I feel stressed when I do not find the time for exercise. | .124 | -.142 | -.088 | **.543** |
| 5 | EI 5-15<br>(EP 7-40) | Exercise is among my top priorities. | .193 | .092 | -.063 | **.724** |
| 6 | EI 6-24<br>(ETMPE 9-61) | I feel (get) upset when I miss my exercise activities. | .189 | -.150 | -.105 | **.553** |
| 7 | EI 7-26<br>(EP 11-67) | I don't (do not) value exercise. | .087 | -.052 | .081 | **.642** |
| 8 | EI 8-30<br>(EP 3-11) | I make exercise an important part of my life. | .131 | .105 | -.018 | **.793** |
| Subscale Definition | | Exercise Documentation: Documentation, monitoring, and recording of future and completed exercise activities through the use of notes, "to do lists', calendars, diaries, logs, day-timers, and written exercise schedules. | | | | |
| 9 | ED 1-5<br>(ED 10-77) | I check exercise off my "to do list" as soon as I finish exercising. | -.094 | -.114 | **-.548** | .217 |
| 10 | ED 2-9<br>(ED 4-23) | I record the amount of time I spend exercising in a day-timer or on a calendar. | .089 | .098 | **-.797** | -.058 |
| 11 | ED 3-13<br>(ED 5-36) | I write my exercise schedule down. | .200 | .011 | **-.689** | -.023 |
| 12 | ED 4-17<br>(ED 6-45) | I use a day-timer to block out time for exercise. | -.065 | -.016 | **-.796** | .061 |
| 13 | ED 5-22<br>(ED 7-52) | I keep an exercise log or diary. | .234 | .106 | **-.616** | -.045 |
| 14 | ED 6-29<br>(ED 9-73) | I record my exercise sessions on a calendar. | .086 | .024 | **-.827** | -.108 |
| 15 | ED 7-32<br>(ED 11-83) | I document my exercise activities. | .171 | .084 | **-.810** | -.085 |
| 16 | ED 8-34<br>(ED 12-86) | I check my "to do lists" frequently so I do not forget to exercise. | -.094 | -.114 | **-.548** | .217 |

Table 60 continued

*Principal Axis Extraction for 4 Factors Followed by Oblimin Transformation ($\Delta$ =0; $k$ =29; $N$ = 430)*

| # | Item | Item Description | Factor | | | |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| Subscale Definition | | Perceived Ability to Manage Time for Exercise: The perceived ability to prioritize and maintain exercise priorities, the perceived ability to organize and schedule exercise activities, the perceived ability to accurately estimate the time required for exercise and the compatibility of chosen exercise activities and the awareness of personal time limitations for exercise. | | | | |
| 18 | PAMTE 2-7<br>(SE 2-15) | I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time. | -.180 | **.565** | -.064 | -.045 |
| 19 | PAMTE 4-16<br>(ATES 6-41) | The exercise activities I enjoy are inconvenient because they take up too much time. | .010 | .560 | .004 | .327 |
| 20 | PAMTE 5-19<br>(ATES 7-47) | I often miss-out on my exercise activities because I am over-committed. | -.013 | **.649** | -.058 | .094 |
| 21 | PAMTE 6-21<br>(ATES 8-51) | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | -.010 | **.499** | -.022 | -.190 |
| 22 | PAMTE 7-27<br>(ATES 11-68) | I underestimate the time it will take to complete my exercise activities. | .096 | **.466** | .083 | -.092 |
| Subscale Definition | | Setting Exercise Goals: Goal setting behavior including the setting of short term, long term, seasonal, specific, reasonable, clear, challenging, measurable goals related to exercise participation and adherence, and the revision of these goals when needed. | | | | |
| 22 | SEG 2-6<br>(SEG 3-13) | I (periodically) evaluate my exercise goals (to see if they need changing). | **.564** | -.059 | -.176 | .170 |
| 23 | SEG 3-10* | I set specific exercise goals (e.g., I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g., I am going to start exercising more often). | **.556** | .018 | -.167 | .200 |
| 24 | SEG 5-18<br>(SEG 7-44) | I set short term exercise goals for what I want to accomplish each week. | **.474** | -.109 | -.290 | .032 |
| 25 | SEG 6-20<br>(SEG 8-49) | I don't set (have) long term exercise goals. | **.487** | .180 | .044 | .150 |
| 26 | SEG 7-23<br>(SEG 9-62) | I set (have) short term exercise goals. | **.706** | -.057 | -.097 | .023 |
| 27 | SEG 9-28<br>(SEG 11-72) | I set challenging exercise goals (for myself). | **.609** | -.091 | .035 | .249 |
| 28 | SEG 10-33<br>(SEG 13-84) | I revise my exercise goals (when needed). | **.741** | .016 | -.161 | -.047 |
| 29 | SEG 11-35* | I set exercise goals that are reasonable for me. | **.547** | -.127 | -.026 | .186 |

*Note.* Items are identified by subscale number and overall number, i.e., SEG 3-13 refers to the third SEG item and is the 13th item of the TIMES. Scale reference in brackets refers to 1st edition TIMES. Item content in brackets refers to 1st edition TIMES wording. * indicates new items that were not included in 2nd edition TIMES. Values in bold indicate singlets.

The items selected for each of the four factors or subscales were those items that were in common between both subsamples. The first factor identified was the SEG subscale, consisting of 8 items with pattern coefficients ranging from 0.47 to 0.74. Factor 2 appeared to be the PAMTE subscale and consisted of 5 items with pattern coefficients ranging from 0.47 to 0.65. Factor 3 was identified as the ED subscale comprising 8 items with pattern coefficients ranging from 0.55 to 0.83. Lastly, Factor 4 was identified as the EI subscale consisting of 8 items with factor loadings ranging from 0.55 to 0.80.

Despite the addition of field test items to the TIMES in the second empirical study, only two new items were included in the third edition of the TIMES (SEG 3-10 and 11-35). With the exception of the two new items fitting the SEG subscale, all 27 remaining items fit the same subscales as in the second edition of the TIMES. For example, all eight of the EI and ED subscales for the third edition of the TIMES consisted of the same second edition TIMES items. The SEG subscale contained six second edition TIMES items and two new items. Lastly, the PAMTE subscale contained five of the eight second edition PAMTE items.

Similar to the first empirical field test, there was strong convergence between the judges' ratings and the ED and SEG factors. Again, all of the items fitting the third edition ED subscale were originally written for and judged by the panel of experts to fit the ED subscale of the first edition of the TIMES. The same pattern was true for six of the eight SEG items. Similar to the second edition TIMES findings, five of the eight items fitting the third edition EI subscale were originally designed for and judged relevant to the EP subscale of the first edition of the TIMES. Two of the three remaining items were originally written for the ETMPE subscale and one item was originally written for the SE subscale. However, as stated in Chapter 5, these items reflected the importance of exercise to individuals and their reactions when they could not find the time for exercise.

Similar to the findings of the first empirical field test, the third edition, five item PAMTE subscale appears to be an inconvenience factor caused by individuals' inability to manage their time for exercise. Four items that fit the PAMTE subscale in the second edition of the TIMES but were originally written for the ATES subscale, fit the third edition PAMTE subscale. Furthermore, the same item that was originally written for the SE subscale but fit the second edition PAMTE subscale, also fit the third edition PAMTE subscale. Taken together, the overlap between the judges' ratings and the factor analysis revealed that there was strong convergence of evidence for two of the factors (ED and SEG) and good evidence for the EI and PAMTE factors.

The correlations between the factors ranged from -.51 to .57 (see Table 61).

Table 61

*Correlations Among the Factors of the 29-Item TIMES*

| Factor | SEG | PAMTE | ED | EI |
|---|---|---|---|---|
| SEG | 1.00 | | | |
| PAMTE | -0.02 | 1.00 | | |
| ED | -0.51 | 0.02 | 1.00 | |
| EI | 0.57 | -0.10 | -0.35 | 1.00 |

### *Complete Sample Results of the Item and Scale Analysis*

The item and scale analyses were repeated for the third edition of the TIMES using the data from the total sample (see Table 62). Results were similar to the item analysis of either sample alone with three of the subscales (SEG, ED, and EI) having very high internal consistency values. In contrast, the internal consistency for PAMTE was marginal. Complete results are reported in Appendix M.

Table 62

*Summary Results of TIMES Item Analysis (n = 430, k = 29)*

| Subscale | *M* Scale | *SD* of Scale | *R* of Item Means | *R* of Item-subscale correlation | Internal Consistency |
|---|---|---|---|---|---|
| SEG | 13.1 | 8.0 | 1.16-2.24 | .49-.74 | 0.89 |
| ED | 6.9 | 7.7 | 0.66-1.21 | .53-.82 | 0.92 |
| PAMTE | 10.6 | 4.4 | 1.58-2.60 | .38-.49 | 0.68 |
| EI | 17.0 | 6.7 | 1.92-3.35 | .56-.83 | 0.91 |

*Note.* EI refers to Exercise Importance, ED refers to Exercise Documentation, PAMTE refers to perceived Ability to Manage Time for Exercise, and SEG refers to Setting Exercise Goals.

### *Redefinition of the TIMES Subscales*

The PAMTE and SEG subscale definitions were modified slightly to more closely resemble the items comprising these subscales. For example, the phrase, "The perceived ability to prioritize and maintain exercise priorities…" was removed from the PAMTE definition. Similarly, the terms, "seasonal goals" and "measurable goals" were removed from the SEG subscale definition. No modifications were made to the definitions for either the EI or the ED subscales (see Table 63).

Table 63

*Subscale Definitions for the Time Management Exercise Scale ($3^{rd}$ ed.)*

| Subscale | Definition |
|---|---|
| Exercise Importance | Focused commitment to exercise, making exercise a priority in life, acknowledgement of the importance of exercise, and feelings of anxiety or stress over lack of time for exercise. |
| Perceived Ability to Manage Time for Exercise | The perceived ability to schedule exercise activities, the perceived ability to accurately estimate the time required for exercise and the compatibility of chosen exercise activities, and the awareness of personal time limitations for exercise. |
| Setting Exercise Goals | Goal setting behavior including the setting of short term, long term, specific, reasonable and challenging goals related to exercise participation and adherence, and the revision of these goals when needed. |
| Exercise Documentation | Documentation, monitoring, and recording of future and completed exercise activities through the use of notes, "to do lists", calendars, diaries, logs, day-timers, and written exercise schedules. |

### *Additional Validity Evidence for the TIMES ($3^{rd}$ ed.)*

*Correlations among subscales.* Three of the TIMES subscales were significantly related to each other (SEG, ED, and EI) with correlations ranging in magnitude from .48 to .71. In contrast, the PAMTE subscale was not related to any of the TIMES subscales (see Table 64).

Table 64

*Descriptive Statistics and Correlations Among the TIMES Subscales*

| Subscale | SEG | ED | PAMTE | EI |
|---|---|---|---|---|
| SEG | .89 | | | |
| ED | .60** | .92 | | |
| PAMTE | -.06 | -.00 | .68 | |
| EI | .71** | .48** | -.05 | .91 |
| *M* | 13.1 | 6.9 | 10.6 | 17.0 |
| *SD* | 8.0 | 7.7 | 4.4 | 6.7 |

*Note:* Correlations were conducted using pairwise deletion. Means and *SD* were computed with missing values replaced with the mean scores for the remaining items. Diagonal elements are subscale internal consistency values. **Correlation is significant at the 0.01 level.

*Relationships among the TIMES subscales and demographic variables.* In terms of demographic variables, significant correlations ($p < .05$) were found. The SEG subscale was significantly related to age ($r = -.12$), formal time management experience ($r = -.11$), and informal time management ($r = -.10$). Similarly, the EI subscale was significantly related to age ($r = -.13$), but no other demographic variables. The ED subscale was significantly related to formal time management ($r = -.10$) and informal time management ($r = -.11$). In contrast, PAMTE was significantly related to years of education ($r = .13$) and age ($r = .10$). However, all of the significant correlations between the demographic variables and the TIMES subscales were small.

*Relationships among the TIMES subscales and time management behavior.* In contrast to what was expected, negative relationships were found between all of the TIMES subscales and time management experience variables except PAMTE and informal time management experience (see Table 65). However, all of the significant correlations were small. These results suggest that previous experiences with formal and informal time management have little to do with exercise-related time management as measured by the TIMES

Table 65

*Correlations Among the TIMES Subscales and Time Management Variables*

| Factor/ Variable | SEG | ED | P | EI | FTM | IFTM |
|---|---|---|---|---|---|---|
| SEG | 1.00 | | | | | |
| ED | .60** | 1.00 | | | | |
| P | -.06 | -.00 | 1.00 | | | |
| EI | .71** | .48** | -.05 | 1.00 | | |
| FTM | -.11* | -.10* | -.07 | -.05 | 1.00 | |
| IFTM | -.10* | -.11* | .06 | -.03 | 0.27** | 1.00 |

*Note.* EI refers to Exercise Importance. SEG refers to Setting Exercise Goals. P refers to Perceived Ability to Manage Time for Exercise. ED refers to Exercise Documentation. FTM refers to formal time management experience. IFTM refers to informal time management experience. * $p < .05$ ** $p < .001$.

*Relationships among the TIMES subscales and exercise behavior.* It was anticipated that positive relationships would exist between the subscales of the TIMES and exercise behavior with more active participants scoring higher on the subscales (see Table 66). Overall exercise behavior as assessed using Godin's Leisure Score Index was significantly correlated at the .05 level to the SEG, ED, and EI subscales with correlations ranging from .22 to .37. The pattern of relationships between the TIMES subscales and the different levels of exercise intensity were consistent with stronger significant relationships existing for strenuous and moderate exercise activity levels. Stronger relationships also existed between moderate and strenuous intensity exercise and EI and

SEG. These results suggest that students who set exercise goals, document their exercise, and believe exercise is important are more likely to be active.

Table 66

*Correlations Among the TIMES Subscales and Exercise Behavior Variables*

| Factor/ Variable | SEG | ED | P | EI | Stren | Mod | Mild | LSI | SOC |
|---|---|---|---|---|---|---|---|---|---|
| SEG | 1.00 | | | | | | | | |
| ED | .60** | 1.00 | | | | | | | |
| P | -.06 | -.00 | 1.00 | | | | | | |
| EI | .71** | .48** | -.05 | 1.00 | | | | | |
| Stren | .42** | .33** | .17** | .54** | 1.00 | | | | |
| Mod | .26** | .15** | -.03 | .24** | .50** | 1.00 | | | |
| Mild | .17** | .11 | -.03 | .16** | .25** | .45** | 1.00 | | |
| LSI | .37** | .22** | -.04 | .43** | .69** | .69** | .73** | 1.00 | |
| SOC | .56** | .38** | .02 | .70** | .51** | .27** | .12* | .41** | 1.00 |

*Note.* EI refers to Exercise Importance. SEG refers to Setting Exercise Goals. P refers to Perceived Ability to Manage Time for Exercise. ED refers to Exercise Documentation. Stren refers to strenuous exercise. Mod refers to moderate exercise. Mild refers to mild exercise. LSI refers to leisure score index. SOC refers to Stage of Change for Exercise. * $p < .05$. ** $p < .001$.

There were also statistically significant differences in all subscale scores depending on exercise behavior. For each of the TIMES subscales, participants classified as Active (Action or Maintenance) scored significantly higher than participants classified as inactive (Precontemplation, Contemplation, and Preparation) (see Table 67).

Table 67

*Mean Differences in TIMES Subscale Scores According to SOC Activity Classification*

| TIMES Subscales | Active Classification | *n* | *M* | *SD* | *df* | *t* |
|---|---|---|---|---|---|---|
| SEG | Inactive | 206 | 9.3 | 6.9 | 423 | -10.63** |
| | Active | 219 | 16.7 | 7.3 | | |
| ED | Inactive | 206 | 4.4 | 6.2 | 404.3[a] | -6.78** |
| | Active | 219 | 9.2 | 8.2 | | |
| PAMTE | Inactive | 206 | 10.1 | 4.9 | 393.9[a] | -2.30* |
| | Active | 219 | 11.1 | 3.9 | | |
| EI | Inactive | 206 | 12.8 | 5.6 | 423 | -16.02** |
| | Active | 219 | 21.0 | 5.0 | | |

*Note.* [a] refers to independent t-tests conducted when equal variances can not be assumed. ** $p < .01$.
* $p < .05$.

*Relationships among the TIMES subscales and the TPB.* In terms of the theory of planned behavior, it was anticipated that participants with more motives to exercise, fewer exercise barriers, and more perceived control over time for exercise would score higher on the subscales of the TIMES (see Table 68). This pattern was seen for some but not all of the subscales. For example, significant relationships were found between all TIMES subscales and the exercise behaviors and perceived control over time variables. In contrast, exercise motives was not related to PAMTE. Perceived Ability to Manage Time for Exercise showed the strongest relationship to perceived control over time. However, all interpretations of the relationships between the TPB subscales and the TIMES subscales should be done with caution due to the low internal consistency values found for the TPB subscales.

Table 68

*Correlations Among the TIMES Subscales and the Theory of Planned Behavior Variables*

| Factor/ Variable | SEG | ED | P | EI | Mot | Barr | L of T | PCT |
|---|---|---|---|---|---|---|---|---|
| SEG | 1.00 | | | | | | | |
| ED | .60** | 1.00 | | | | | | |
| P | -.06 | -.00 | 1.00 | | | | | |
| EI | .71** | .48** | -.05 | 1.00 | | | | |
| Mot | .35** | .19** | -.02 | .39** | 1.00 | | | |
| Bar | -.36** | -.24** | -.36** | -.38** | -.05 | 1.00 | | |
| L of T | -.13** | -.12** | -.10* | -.44** | .05 | .59** | 1.00 | |
| PCT | .27** | .24** | .37** | .34** | .17** | -.37** | -.42** | 1.00 |

*Note*. EI refers to Exercise Importance. SEG refers to Setting Exercise Goals. P refers to Perceived Ability to Manage Time for Exercise. ED refers to Exercise Documentation. Mot refers to motives for exercise. Bar refers to barriers to exercise. L of T refers to lack of time for exercise. PCT refers to perceived control over time. * $p < .05$. ** $p < .001$.

### *Summary of Additional Validity Evidence for the TIMES*

As expected, there were significant correlations among the TIMES subscales, and the TIMES subscales with demographic, exercise behavior, and the TPB variables. Although significant correlations were found, it is likely that not all the relationships are of practical importance. For example, the correlations between the TIMES subscales and time management experience were small (i.e., $r < -.11$) while the relationships between the TIMES subscales (EI, SEG, and ED) and SOC for exercise were moderate (i.e., $r > .38$). In addition, the finding that the PAMTE subscale was not related to any of the TIMES subscales nor to overall exercise behavior, SOC, or exercise motives was unexpected. Finding statistically significant and practically important relationships between the TIMES subscales and other relevant external criteria provides additional validity evidence for the interpretation of the TIMES scores.

# CHAPTER SEVEN

## Discussion and Conclusions

### *Summary*

*Purpose of Study*

There is a lack of research examining the influence of time management on exercise. Concomitant with this lack of research, there currently is no established assessment instrument to measure time management in relation to exercise adoption, participation, and adherence. Thus, the purpose of this study was to develop and gather validity evidence for a time management for exercise assessment scale, the TIMES. Validity evidence was gathered through subjecting the TIMES to an extensive psychometric assessment and construct validation process which included: (a) specifying the domain of exercise related time management; (b) developing a pool of items; (c) accumulating validity evidence for the item pool, and, therefore, the domain to which the items are referenced, and (d) by subsequently selecting and collecting empirical validity evidence for a final set of items, or the TIMES.

*Procedures*

Six procedures were involved in the development and validation of the TIMES. First, the skills and behaviors that define time management for exercise were established by reviewing scholarly and popular literature on time management. Second, an item pool was developed by examining existing time management scales from the educational and organizational domains, and modifying appropriate items for the exercise domain. To further ensure content representativeness, new exercise related time management items were created.

Third, a panel of ten experts in time management and/or exercise assessed the content related validity evidence for the TIMES. Specifically, the expert panel members were required to judge the relevancy of each item to the domain to which it was referenced and the representativeness of the set of items retained for the population of interest. Fourth, in order to clarify the readability of the TIMES, a small pilot sample of students determined the clarity of the items and the instructions.

Fifth, in order to gather empirical validity evidence for the TIMES, the first field study of the TIMES was conducted with a sample of 510 undergraduate students. Specific analyses conducted on the ensuing data included item and scale analyses, exploratory factor analysis, an integration of the judgmental, factor, and item analyses, and an examination of the descriptive characteristics of the TIMES subscales. Lastly, a second field study of the TIMES was conducted with a sample of 430 undergraduate students in order to gather additional validity evidence for the TIMES. The sample was randomly divided into two subsamples to allow an assessment of the stability of the findings derived from the analyses, which included the procedures used in the first field study.

### *Major Findings*

1. The literature review identified seven characteristics of time management for exercise that were used as the foundation for seven TIMES subscales: Setting Exercise Goals (SEG), Prioritization of Exercise (EP), Scheduling Exercise (SE), Exercise Organization (EO), Awareness of Time and Exercise Suitability (ATES), Exercise Documentation (ED), and Exercise and Time Management Preferences

and Emotions (ETMPE). The initial pool of items consisted of 91 items with 13 items for each of the seven subscales.

2. According to the expert panel members' ratings of the items, 49 items overall were classified as relevant and the set of relevant items was representative of the domain to which they were referenced. The subscales with the most relevant items were SEG, EP, and ATES.
3. Exploratory factor analysis of the 91-item TIMES yielded four correlated and interpretable factors. In total, 77 items loaded across the four factors. To reduce the number of items, items were deleted based on the results of both the judgmental and factor analyses. This resulted in a final factor structure of 32 items with eight items per subscale and pure simple structure. Subscales were identified as Exercise Importance (EI), Setting Exercise Goals (SEG), Exercise Documentation (ED), and Perceived Ability to Manage Time for Exercise (PAMTE). On the recommendation of the expert panel members, five additional items were added to the 32-item TIMES for the next validation phase.
4. Time management for exercise, as measured by the 32-item TIMES, appears to be related to exercise behavior with higher scores on the subscales (and lower scores on the subscale PAMTE) significantly related to more exercise behavior. Furthermore, significant relationships exist between the TIMES subscales and the theory of planned behavior variables.
5. In the second field study, neither the $k = 37$ nor the $k = 32$ factor structures were confirmed to fit the data in both of the subsamples but an interpretable 29-item

factor pattern portraying simple structure emerged from the exploratory factor analysis.

6. Exploratory factor analysis of the 29-item TIMES was conducted using the complete data set (*N* = 430) resulting in a factor pattern portraying parsimony, simple structure, salient loadings, and a substantively meaningful solution. Factor 1, consisting of 8 items was identified as the SEG subscale ($\hat{\alpha} = 0.89$). Factor 2, consisting of 5 items was identified as the PAMTE subscale ($\hat{\alpha} = 0.68$). Factor 3 consisting of 8 items was identified as the ED subscale ($\hat{\alpha} = 0.92$). Factor 4 consisting of 8 items was identified as the EI subscale ($\hat{\alpha} = 0.91$).
7. Three of the TIMES subscales (SEG, ED, and EI) were significantly related to each other with correlations ranging in magnitude from .48 to .71. In contrast, the PAMTE subscale was not related to any of the TIMES subscales.
8. Exercise behavior of strenuous intensity and SOC for exercise were significantly correlated with the SEG, ED, and EI subscales with correlations ranging from .30 to .70. The PAMTE subscale was not related to SOC for exercise and only weakly related to strenuous exercise ($r = .17$). These results suggest that students who set exercise goals, document their exercise, and believe exercise is important are more likely to be active. Furthermore, for each of the TIMES subscales, participants classified as active scored significantly higher than participants classified as inactive.
9. The Theory of Planned Behavior variables were significantly related to the SEG, ED, and EI subscales. PAMTE was significantly related to perceived control over time for exercise, exercise barriers, and lack of time for exercise.

### *Limitations of Study*

Several factors constrain the generality of this study. First, the TIMES is a self-report questionnaire and thus is potentially limited by respondent biases such as item interpretation, recall, and social desirability. Second, in addition to the review of research, a content analysis could have been conducted where open-ended questions are posed to a sample of subjects about the construct of interest (Fiske, 1971; Kifer, 1977). Interviews could also have been conducted with individuals who manage their time for exercise well. The time management for exercise tips, skills, and behaviors gathered from such individuals may have helped in item creation and in developing the theoretical model of time management. Third, the empirical validation of the TIMES and its subscales was conducted with undergraduate university students and consequently, generalizations to children, or adults over the age of 30 are not possible.

The fourth limitation to the development and validation of the TIMES scale was the number and distribution of the reverse scored TIMES items. In each version of the TIMES, the polarity of approximately one-third of the items was reverse scored in order to prevent a response bias. However, the polarity of approximately one-half of the items should have been reversed (Crocker & Algina, 1986). Furthermore, the reverse scored items were not equally distributed throughout the scale. Initially, 34 of the 91 items (37.4%) developed for the first version of the TIMES were reverse scored including one ED item (7.7%), three ETMPE items (23.1%), five of the EO, EP, SEG items (38.2% respectively), six of the SE items (46.2%), and nine ATES items (69.2%). The reduced second edition TIMES consisted of 37 total items, of which 11 items (29.7%) were reverse scored. For the final 29-item, four factor solution, the polarity of nine of the 29 items (31.0%) were reverse scored including three of the eight (37.5%) EI items, one of the eight SEG items, and all five of the PAMTE items. The unequal distribution of the reverse scored items may have been a leading contributor to the low internal consistency of the PAMTE subscale. It is possible that the items constituting the PAMTE subscale fit that particular subscale best, not because of true PAMTE content but because of the common negative item polarities.

This limitation most likely occurred because the TMB (Macan et al., 1990) scale was used as the foundation for the development of the time management for exercise items. The original TMB (Macan et al., 1990) scale consisted of 46-items across four factors, of which 18 were negative (39.0%). The negative polarities were also not distributed equally across the TMB scale: All five of the items fitting Factor 4 (Preference for Disorganization) were reverse scored. In addition, nine of the 13 items (69.2%) fitting factor 3 (Perceived Control Over Time) and 4 of the 13 (30.8%) items fitting Factor 2 (Mechanics of Time Management) were reverse scored.

## *Conclusions*

A third draft of the TIMES has been created following the empirical validation of the second edition of the TIMES. Four independent subscales were identified: SEG, ED, PAMTE, and EI. Three of the subscales (SEG, ED, and EI) consist of eight items each and one subscale (PAMTE) consists of 5 items. The reliability of the scales referenced to each subdomain ranged from 0.68 (PAMTE) to 0.92 (ED) in the final 29-item TIMES structure. Surprisingly, not all of the subscales were related. Perceived Ability to Manage Time for Exercise was not related to any of the three other subscales.

Judgmental results provided content-related evidence of validity for the structure of time management for exercise. The expert panel members judged 24 of the 32 first edition TIMES items (75%) to be relevant and 87.5% of the EI, SEG, and ED items relevant. Furthermore, the majority of the judges indicated that all subscales possessed evidence of item representativeness.

The empirical cross-validation conducted with the second field test was effective in providing evidence of replication. Although none of the factor structures could be confirmed to fit the data, an interpretable and replicable factor pattern portraying parsimony, simple structure and salient loadings emerged from the exploratory factor analysis. Moreover, the factor patterns of all eight items originally written for the ED and EI subscales, six items from the SEG subscale, and five items from the PAMTE subscale were replicated. Overall, 82.9% of the items were replicated.

Despite the substantive interpretability of the PAMTE subscale, the PAMTE subscale was the only under-performing subscale with a marginal internal consistency value of 0.68. However, this subscale was the only subscale to substantially differ from any of the original seven hypothesized subdomains. In addition, the negative polarity of all of the PAMTE items may have contributed to this low internal consistency value. Although an internal consistency value of 0.68 for five items is lower than expected, it is not a cause for serious concern, as research has shown that internal consistency values of 0.80 and 0.90 are obtainable for 10 and 20 items respectively with well designed items (Rogers, 2000). In order to increase this marginal internal consistency value and to ensure content representativeness, the polarity issue will need to be addressed and additional

PAMTE items will need to be developed and field tested in the next edition of the TIMES.

Time management for exercise participation and adherence, as measured by the 29-item TIMES, appears to be related to exercise behavior in the student population examined with higher scores on the subscales (and lower scores on the subscale PAMTE) significantly related to strenuous exercise behavior and exercise stage of change. There are also statistically significant differences between student performance on each of the TIMES subscales and students classification as Active or Inactive using the SOC continuum. Furthermore, the subscales appear to support the theory of planned behavior with significant relationships across the theory of planned behavior variables.

The development and the initial validation of the TIMES is only the first step of a lengthy validation process ensuring that valid interpretations can be made with respect to time management for exercise. The TIMES is the first instrument to specifically assess the skills and behaviors relating to time management for exercise adoption, participation, and adherence. By assessing individuals' use of exercise related time management skills via the TIMES, perceived lack of time for exercise can be directly confronted potentially affecting exercise participation and adherence patterns and positively impacting public health.

## *Implications for Practice*

The significance of developing a measurement instrument assessing time management specific for exercise is fivefold. First, a time management instrument specific for exercise can provide a method for individuals to assess their own time management behaviors. Second, exercise psychologists and researchers will have available an exercise related time management instrument that they can use for further study of the lack of time as a perceived barrier to exercise. Third, the time management scale for exercise can be used as a tool to identify potential candidates for exercise related time management skills training and diagnose individual time management for exercise training needs. Fourth, the measurement scale can be used to identify individuals who, subsequent to initiating exercise, may use lack of time or poor time management skills as an excuse for not exercising. Finally, the measurement scale can be used in program evaluations of time management training programs for exercise.

### *Implications for Future Research*

Future studies involving the TIMES should focus on the impact of the unequal distribution of reverse polarity items in the TIMES, accumulation of additional evidence of reliability and validity, testing the theoretical model of time management for exercise, and applications of the TIMES. In addition, methodological issues that have been illuminated by the development and validation of the TIMES should be addressed.

Future research should examine whether qualitative interviews can add to the representativeness of the scale. For example, interviews with individuals who manage their time for exercise well and individuals who have trouble fitting exercise into their lives may both provide valuable information regarding the domain of time management for exercise. Any time management for exercise tips, skills, and behaviors gathered from such individuals may help in creating new items (especially for the PAMTE subscale), explaining the lack of relationship between the PAMTE and the other TIMES subscales, and in developing the theoretical model of time management.

Future studies should also examine the factor structure and composition of the final 29 TIMES items with an independent sample of undergraduate university students. This examination could be conducted from either a confirmatory or an exploratory theoretical framework. If a confirmatory model is chosen, modifications to the number of parameters that are constrained may be necessary to increase the probability of model fit. Additional indices of model fit could also be employed. If an exploratory model is chosen, the factor extraction criteria could be expanded to include parallel analysis (Lautenschlager, 1989; Velicer, Eaton, & Fava, 2000). Once the factor structure of the 29-item TIMES has been confirmed with undergraduate university students, replication could be conducted with alternate populations, including but not limited to, single gender samples, non-university students, or youth.

Furthermore, the stability of the TIMES instrument needs to be assessed. Test-retest reliabilities are important because it is likely that users of the TIMES will be interested in tracking changes over time. In the absence of test-retest reliability information, the TIMES should not be administered before and after a time management for exercise intervention with the assumption that performance changes on the inventory resulted from the intervention.

Studies are also needed to further investigate the relationship of the TIMES subscales scores with scores on relevant external criteria. Preliminary analysis of the 29-item TIMES and stage of exercise change foreshadowed such research. In the second field study, individuals who were classified as active scored significantly higher on all TIMES subscales than those individuals who were classified as inactive. Therefore, future research should conduct contrasted group analyses with groups selected based on exercise stage of change or time management behaviors with the anticipation that participants who are regular exercisers or good time managers will perform differentially on one or more of the TIMES subscales.

Research should also be conducted to examine time management for exercise across different participant characteristics. For example, the amount of exercise related time management skills required may depend upon age. The need for time management for exercise may increase at various times throughout the lifespan as demands on time increase. Furthermore, a high level of skill in time management for exercise may not be required for exercise that is structured and planned, such as team activities, especially if participation is at the competitive level. In contrast, the amount of exercise related time management skills required for unstructured, individual activities such as running, walking, or jogging programs may be considerably more than a sports activity.

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# Appendix A

## Table of Qualitative Studies Examining Time Management

Table of Qualitative Studies Examining Time Management

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Hessing, 1994 | To examine the concept of womens' TM in their combined workloads of household and workplace.<br>To investigate women's strategies for carrying out the combined demands of their paid and household labor. | Qualitative Interviews | 51 female staff members of a mid-sized post-secondary institution.<br>Age $R$ = 20–64 yrs<br>53% Sample (27 Ss) parents of children who live at home.<br>4 of 27 Ss single parents. | Volunteer. | 1. *Interview:* 2 to 4 hours in length.<br>Questions regarding:<br>a) Work biographies<br>b) Household composition & responsibilities<br>c) Nature of workdays<br>d) Perspectives of job<br>e) Attitudes towards women's paid & domestic employment<br>f) Current and past employment<br>2. *Self-Reported Workday:* Chronological order of household activities and workplace activities | 1. Women adapt their use of time to office schedules and household activities.<br>2. Actively involved in manipulating the sequence and duration of activities:<br>a) Prioritization of office schedule<br>b) Routinization of activities<br>c) Synchronization of events<br>d) Extending and condensing the workday<br>e) Preparation for contingency<br>f) Scheduling the household<br>3. Combined workloads make TM vital and necessary.<br>4. Time is organized as a resource. |
| Yoels & Clair, 1994 | To research time and its management, how residents learn to manage their time and how residents experience time contingencies. | Qualitative: Field Observations and Interviews. | 150 Housestaff:<br>50 Postgraduate Year 1s (PGY1s)<br>50 PGY2s<br>50 PGY3s<br>76 % Male residents<br>89% White<br>84% of Physicians between 26 and 30. | Volunteer. | 1. *Field Observations:* Observed new patients (under the condition of observer as participant) by following the patients for approximately 2 hours and by following physicians for 2 hours between appointments.<br>Total observations = 173 involving 88 different residents.<br>2. *In-depth Interviews:* Random selection of 25% of residents for interview. | 1. Residents learned that it was necessary to spend less time with patients; to work more quickly.<br>2. Selective attentiveness.<br>3. Deflecting time complaints onto nurses.<br>4. Using other residents for time shortcuts.<br>5. Manipulating (Controlling) the time schedule. |

Table of Qualitative Studies Examining Time Management continued

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Winter, Puspitawati, Heck & Stafford, 1993 | To analyze two TM strategies (reallocation of personal time and obtaining additional help) used to respond to the demands of home based work. | Qualitative Survey, Interviews | 899 Households interviewed which had home based employment.<br>- Interviews conducted with "household manager".<br>- 482 cases, respondent also home based worker.<br>- 417 cases, respondent home based worker's partner or spouse. | Volunteer. | 1. *Characteristics of the Respondent:*<br>a) Age<br>b) Education<br>c) Marital Status<br>d) Gender<br>e) Employment Status<br>2. *Characteristics of the Household:*<br>a) Household Income<br>b) Household Size<br>c) Rural - Urban Location<br>d) Pressure from the home based work<br>3. *Time Management Interview:*<br>a) Question regarding reallocation of personal time<br>b) Question regarding use of additional help | 1. Personal Time is more often reallocated than obtaining additional help for either home based work or household production.<br>2. Different TM strategies are used depending on whether the household manager is also the home based worker.<br>- Respondents holding both roles report reallocating personal time more often than respondents who are not home based workers; reverse is true for obtaining additional help.<br>3. Households generating higher income, where home based work is a full time occupation are more likely to use TM strategies. |

Table of Qualitative Studies Examining Time Management Continued.

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Kotter; 1980 | To examine the performance of a group of successful general managers. | Qualitative: Interviews, Questionnaires | 15 general managers in nine corporations.<br>*M* Age = 47 years. | Volunteer. | 1. Interviews of GM: 3 interviews of at least 5 hours over 6 to 12 months.<br>2. Observations: Daily tasks for 35 hrs.<br>3. Interviews with significant others: 1 hr interviews (approximately 12 people each)<br>4. Questionnaires: Two<br>5. Documents: Business plans, annual reports, appointment diaries. | 1. Most of the GM's were doing a "very good" job.<br>2. Some GM's were rated "excellent" and a few "fair".<br>3. Actual GM behavior is less systematic, more informal, less reflective, less organized and more frivolous than has been reported. |

*Note:* R refers to range. M refers to mean. Ss refers to subjects. Yrs refers to years. TM refers to time management.

# Appendix B

## Table of Quantitative Studies Examining Time Management

Table of Quantitative Studies Examining Time Management.

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Lahmers & Zulauf, 2000 | To identify the factors that are significantly associated with academic performance including both amount of time spent studying and TM ability. | Correlational | 79 undergraduate students.<br>65% Male<br>*M* Age = 21<br>*SD* = 1.6 | Volunteer | 1. *Time Diary*.<br>2. *Time Management Behavior Scale* (TMB; Macan et al., 1990). | 1. TM ability was not significantly associated with scheduled class time or study time.<br>2. Amount of study time was significantly and positively related to grade point average. |
| Williams, Verble, Price & Layne, 1995 | To determine the relationship between time management practices and personality types and indices in a group of college students. | Experimental | 204 undergraduate and graduate students.<br>48 males,<br>156 females<br>Age range = 18-52 years<br>*M* Age = 21.9. | Volunteer | 1. *Time Management:* Time Management Questionnaire (TMQ; Britton & Tesser, 1991)<br>2. *Personality Type:* Form G of the MBTI<br>3. *Social Desirability:* Marlowe-Crowne short form | 1. All of the TM indices were significantly related to the J-P Index of Index of the MBTI.<br>2. The TMQ Long Range Planning was significantly related to the S-N Index.<br>3. T-F Index was not related to any of the TM factors.<br>4. Good TM'ers seem to have a preference for planning, organization and sensory based information. |
| Macan, 1994 Study 2 | To compare Ss self-reported TM behaviors with a multitrait-multirater approach in order to increase the construct validity of the TM measures. | Cross-sectional | 341 University students (*N*=260 undergraduate, *N* = 81 graduate students in psychology and business courses)<br>Age Range = 19 - 57<br>Mean Age = 25<br>53 % Female | Volunteer | 1. *Time Management Behaviors (TMB):* 33 behaviors scored on a 5-point Likert-type scale.<br>2. Revised Version of the *Time Management Questionnaire* for Ss coworkers, relatives, friends. | 1. The best convergence was found between self-ratings and coworkers. |

Table of Quantitative Studies Examining Time Management continued

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Simons & Galotti, 1992 Study 1 | To assess planning, prioritization, and completion of daily activities in a college age sample. | Experimental | 88 undergraduate students.<br>46 Freshman (20 male and 26 female)<br>42 Seniors (21 male and 21 female) | Voluntary, uncompensated participation. | 1. *Definition of "Planning" Essay.*<br>2. *Galotti-Simons Planning Survey (GSPS):* Planning practices questionnaire.<br>3. *Goal-Setting Task:* Ss listed all goals for next day in order.<br>4. *Goal prioritization task:* Assigned each goal a priority value.<br>5. *Accomplishment Scheduling:* Self-report of goal accomplishments<br>6. *Follow-up Questionnaire* | 1. Senior's scores on the GSPS higher than freshman.<br>2. Female scores on the GSPS higher than males.<br>3. Ss with higher GSPS scores were less likely to describe planning in terms of "stress reduction", "predetermined decisions" and "anticipating the future".<br>4. Male GSPS scores highly correlated with "achieving satisfaction" and female scores marginally correlated with "organizing".<br>5. Poor planners separated high priority goals from medium and low priority goals. Good planners separated high priority goals from low priority but did not distinguish high priority goals from medium. |
| Simons & Galotti, 1992 Study 2 | To replicate study 1 findings by using a more precise operationalization of goal completion. | Experimental | 48 undergraduate Ss<br>13 male<br>26 female | Volunteer. | *Same measures and instruments as in Study 1 with the exception of item 5.*<br>5. *Goal Completion:* Ss were given a typed list of their prioritized goals and were asked to check off each goal that they had completed. | 1. Study 2 findings replicated study 1.<br>2. No major behavioral differences were found between good and poor planners, however, this study occurred over one day, the differences between the groups may be accentuated for longer range planning. |

Table of Quantitative Studies Examining Time Management continued

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Britton & Tesser, 1991 | To examine if students with well developed time management practices would accomplish more intellectually and therefore would have higher grade point averages. | Experimental Prospective Study - (4 years) | 90 male and female freshman and sophomore university undergraduates enrolled in an introductory psychology class. | Volunteered for course credit. | 1. *Time Management Questionnaire (TMQ):* 35 items answered on a 5-point scale.<br>2. *Grade Point Average:* Cumulative GPA from October 1983 - September 1987 on a 4 point scale.<br>3. *Scholastic Aptitude Test:* Total SAT scores | 1. 3 Main factors associated with the TMQ: a) Short Range Planning b) Time Attitudes c) Long Range Planning<br>2. Self-reports of TM are related to academic achievement<br>3. The effects of time management are independent of SAT scores and stronger than SAT scores. |
| Macan, Shahani, Dipboye, & Phillips, 1990 | To examine the dimensionality of conventional TM behaviors and to examine the correlates of time management behavior. | Correlational Field Study | 288 Ss<br>125 Ss completed the TMB only.<br>165 Ss completed additional scales<br>213 Ss undergraduate students<br>51 masters students<br>24 full time teachers<br>- Of the 165 Ss who completed additional data: *M* age = 24.77<br>- 134 of the 165 Ss provided information on gender: 81 women, 53 men. | Volunteer for extra course credit. | 1. *TMB*<br>2. *Role Ambiguity:* 6 item scale, adopted from Rizzo, House & Lirtzman (1970)<br>3. *Role Overload:* 3 item scale adopted from Beehr, Walsh & Tabler (1976)<br>4. *Job-induced and somatic tension:* Adopted from House & Rizzo (1972)<br>5. *Satisfaction:* a) Job Measure: adopted from Parry & Warr (1980) b) Life Satisfaction: adopted from Kornhauser (1965)<br>6. *Type A-B Behavior Pattern:* Form C of the Jenkins Activity Survey (Jenkins et al., 1965).<br>7. *Performance:* a) Self-reported GPA b) Self-reported performance. | 1. Self-reported TM is multi-dimensional: The TMB appeared to consist of 4 factors:<br>i)Goal Setting and Prioritizing ii) Time Management Mechanics<br>iii) Perceived Control of Time iv) Preference for Disorganization .<br>2. Various Time Management Behaviors are related to outcome variables: Perceived Control of Time (Factor 3) identified as strongest correlate. |

Table of Quantitative Studies Examining Time Management continued

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Lang, Gilpin, & Gilpin, 1990 | To assess whether hygienists would have significantly higher distress than the national norm and whether hygienists would report that time-related factors were significantly more stressful than other stressful factors. | Correlational | 49 practicing dental hygienists in the Waterloo, Iowa district.<br>*M* age = 32.1 years (*SD* = 7.8%) | Volunteer | 1. Demographic Questionnaire<br>2. 53-item Brief Symptom Inventory (Derogatis & Spencer, 1982)<br>3. 31 Likert items referring to sources of stress across 6 content areas including 5 items focusing on scheduling and TM. | 1. Time management is a particular concern, especially inefficient use of time, lack of control over time demands, and inadequate amounts of time. Hygienists showed significantly more stress-related symptoms than the national norms. |

*Note:* Ss refers to subjects. TM refers to time management.

# Appendix C

## Table of Studies Examining the Effectiveness of Time Management Interventions

Table of Studies Examining the Effectiveness of Time Management Interventions.

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Macan, 1996 | To examine the effects of a TM training program on employees' self-reports of TM behavior, control over their time, job satisfaction, stress responses and job performance. | Quasi-experimental field study | 38 employees received TM training<br>39 employees in control.<br>80% Female<br>Mean Age = 36 Years | Volunteer | 1. *Time Management*: Time Management Behavior Scale (TMB) (Macan, 1994; 1990). 33 items, measuring goal setting/ prioritizing, mechanics of time management, preference for organization.<br>2. *Perceived Control Over Time:* 5 items (Macan, 1994; 1990).<br>3. *Job-induced tension scale*: 6 items (House & Rizzo, 1972)<br>4. *Somatic tension scale*: 5 items (House & Rizzo, 1972)<br>5. *Job satisfaction scale* :3 items (Hackman & Oldham, 1975) | 1. Participants did not report engaging more frequently in TM behaviors after participating in the TM training program.<br>2. Participants who did receive TM training did perceive more control over their time.<br>3. Participants who received TM training did not differ in job performance.<br>4. No significant differences were found between training and no training groups for job satisfaction and job induced tensions. |

Table of Studies Examining the Effectiveness of Time Management Interventions Continued.

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Macan, 1994 Study 1 | To examine the structure of the Time Management Behavior Scale (TMB) in an employed sample and then to assess the linkages among TM training, TM behaviors, perceived control over time and the behavioral outcomes of TM. | Cross-sectional | 353 (usable surveys) Employees at a public service agency and a correctional facility.<br>56% Female<br>Mean Age = 37 Years<br>- 45% of Ss had participated previously in TM seminars.<br>-More than half of the Ss had read TM books | Volunteer | 1. *Time Management Training:* a) Previous training b) Half day of training involving : i)goal setting; ii) prioritizing;<br>iii) making lists;<br>iv)scheduling and planning; v) organization; vi) procrastination; and<br>vii) interruptions.<br>2. *Time Management Behaviors(TMB):* 33 behaviors scored on a 5-point Likert-type scale.<br>3. *Perceived Control Over Time:* 5 items scored on a 5-point Likert-type scale.<br>4. *Job Induced and Somatic Tensions:* a) 6 item Job-Induced Tension Scale b) 5 item Somatic Tension Scale<br>5. *Job Satisfaction:* 3 item General Job Satisfaction scale<br>6. *Job Performance ratings*<br>7. *Person and Situational Variables:* | 1. 3 factors accounted for 81% of the variance:<br>a) Goal Setting & Prioritizing<br>b) Mechanics of Time Management (scheduling & planning)<br>c) Preference for Organization.<br>2. Good support was found for the hypothesized TM model.<br>3. TM training was not found to be very effective in increasing the adoption of certain TM behaviors.<br>4. Ss who set goals and priorities and had a preference for organization perceived themselves to have greater control over their time than those who did not set goals but had a preference for organization.<br>5. A perception of control over time was related to job satisfaction and reduced stress tensions. |

Table of Studies Examining the Effectiveness of Time Management Interventions Continued.

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Orpen, 1993 | To test for the effectiveness of TM training. | Field experiment Random assignment of Ss to experimental and control groups. | 52 Supervisors working for a medium sized Australian manufacturing company. | Part of company training program | 1. *Time Management Program:* 3 Days - Lectures, discussions, exercises and role plays. Based upon Lakein (1991) and Mackenzie (1978) Covered: a) goal setting<br>b) prioritizing<br>c) interruptions<br>d) time planning<br>e) time diaries<br>f) incoming information<br>2. *Self-report Measure of Time Management Effectiveness- Attitudinal:* Immediately after completing the program and 4 weeks after the program.<br>3. *Self-report Measure of Time Management Effectiveness - Behavioral:* Activity Diary | 1. The experimental Ss rated their TM effectiveness significantly more highly than control.<br>2. Among the experimental group, the Ss who felt that the program had reached its' objectives rated their own TM effectiveness higher.<br>3. Correlations between TM effectiveness measure and the extent to which the Ss felt that they benefited were significant for both the self-report measure and behavioral measure.<br>4. TM training seemed to indicate an improvement in time management behavior. |

Table of Studies Examining the Effectiveness of Time Management Interventions Continued.

| Reference | Purpose | Study Design | Sample Size & Composition | Sample Selection | Instruments/Measures | Main Conclusions |
|---|---|---|---|---|---|---|
| Woolfolk & Woolfolk, 1986 | To determine whether preservice teachers will manage their time more effectively after they receive brief training in setting specific goals, making written plans, and self-monitoring their time use. | Experimental Random Assignment of groups to control, basic training and supervised practice in TM (Experimental Group 1) and basic TM training only (Experimental Group 2). | 81 Preservice teachers<br>68 Females<br>13 Males<br>Undergraduate seniors | Volunteer participants, no extra credit. | 1. *Time Management Book* (Lakein, 1973)<br>2. *70 Min presentation on TM.*<br>3. *Supervised practice in daily planning and self-monitoring:* Written plans and time monitoring logs for 2 weeks<br>4. *Intermediate Deadline Task:* 10 page report due fifth week of semester.<br>5. *Delayed Deadline Task:* 8 short reports by 15th week of semester<br>6. *Self-report of Time Management:* Questionnaire<br>7. *Performance During Student Teaching* | 1. Brief training in TM can have immediate and long term effects on the performance of preservice teachers.<br>2. Short term effects were observed for the didactic (basic) training.<br>3. Both experimental groups were more prompt with their work but did not differ from each other.<br>4. Group 1 submitted more reports than other groups.<br>5. Group 1 returned questionnaires more promptly than others, group 2 significantly more prompt than control. |

*Note:* Ss refers to subjects; TM refers to time management.

# Appendix D

## Table of Commercially Available Time Management Instruments

Table of Commercially Available Time Management Instruments.

| Instrument Title | Author | Purpose | Pop. | Scales (Items) | TM Items | Theoretical Basis / Source for Items | Reliability Evidence | Validity Evidence | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| The Time of Your Life | Training House Inc., 1995. | Constructed as a self-assessment tool to provide "insight" into time management. | Employees | TM Scale | 25-item MC | No | No | Content (*face*) validity only. | Little value for research, employee assessment, or employee training (Darr, 1995).<br>Fails to meet the barest minimum standards of scientific development (Faunce, 1995) |
| Time Management Inventory, TMI (Part of the Kirkpatrick Management and Supervisory Skills Series). | Kirkpatrick, 1995. | To measure key factors in better time utilization and delegation. | All levels of managers | TM Scale | Between 45 and 80 items | No | No | Content (*face*) validity only. | Scanty norming, empirical evidence to support score reliability, validity, and biases has yet to be provided. Not recommended as there are no studies to support it as a measure of management skills (Pearson & Droegemueller, 2001). |

Table of Commercially Available Time Management Instruments Continued.

| Instrument Title | Author | Purpose | Pop. | Scales (Items) | TM Items | Theoretical Basis / Source for Items | Reliability Evidence | Validity Evidence | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| Learning and Study Strategies Inventory – High School Version, LASSI-HS | Weinstein & Palmer, 1995 | To assist high school students in determining their study skills strategies, problems and attitudes, and learning practices. | Grades 9-12 | 10 (76; 5 pt L) | TM | Some | Yes; α ranged from .68 to .82. Need intercorrelations among scale scores and test-retest. | No | Norming data limited and restricted. The lack of psychometric evidence makes the use of the LASSI-HS risky and premature among those demanding assurance about its construction, accuracy, and usefulness (Kiewra, 1998). |
| Personal Skills Map, PSM | People Builders International, Inc., 1993 | To self-assess personal skills. | Students (adult - grades 6-12 and elementary-grades 3-5) | 14 (MC) | TM | Yes | Some; 1 week test-retest ranged from .64 to .94, no internal consistency data. | Some: PSM showed differentiation among 3 groups; concurrent validity. More evidence is needed. | Potential but further validity evidence and more generalizable norms are needed (Harnisch, 1998). |

Table of Commercially Available Time Management Instruments Continued.

| Instrument Title | Author | Purpose | Pop. | Scales (Items) | TM Items | Theoretical Basis / Source for Items | Reliability Evidence | Validity Evidence | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| EQ Questionnaire | Wonderlic Inc. & Fasiska, 1993 | To measure entrepreneurial and executive effectiveness, to be used as a personal and organizational development tool. | Adults. | 12 (100 binary response) | TM | Minimal | Minimal, some acceptable levels. Need test-retest. | Minimal | Potential if substantive changes are made including psychometric evidence (Austin, 2001). |
| Checklist of Adaptive Living Skills, CALS | Morreau & Bruininks, 1991 | A criterion-referenced measure of adaptive living skills and a tool for program planning. | Infants to adults | 24 (800 behaviors) | TM Checklist | Some | Yes; α ranged from .74 to .99. | Normative sample problems. Content validity. Need construct validity. | Recommended for trainers of developmentally disabled individuals (Haneghan, 1995). |
| Motivated Strategies for Learning Questionnaire, MSLQ | Pintrich, Smith, Garcia, & McKeachie, 1991 | To assess college student's motivational orientations and their use of different learning strategies for a college course. | College students | 15 (81; 7 pt L) | TM one of Learning Strategies subscales. | Some | Yes; α ranged from .62 to .93 for Motivation scales and from .52 to .80 for Learning Strategies scales. | CFA but little support found for 15 factors. | The reliability data are weak and the validity data is limited and unconvincing of the factor structure. Additional studies are needed (Benson, 1998). |

Table of Commercially Available Time Management Instruments Continued.

| Instrument Title | Author | Purpose | Pop. | Scales (Items) | TM Items | Theoretical Basis / Source for Items | Reliability Evidence | Validity Evidence | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| Functional Needs Assessment, FNA | Dombrowski, 1990. | To provide an integrated, systematic method for assessment, treatment, planning, clinical program designing, and progress monitoring. | Chronic psychiatric patients | 26<br>(130 D) | Time orientation | No | None | None | The absence of appropriate information concerning the development, reliability, and validity of the FNA scores makes it impossible to recommend the instrument (Graham, 1995) |
| Occupational Stress Indicator, OSI | Cooper, Sloan, & Williams, 1988. | To clarify the nature of stress in organizations by identifying sources of stress, intervening factors, and the effects of stress on employees. | Employees | 28<br>(167; 6 pt L) | TM within Coping Subscale | Yes | Split-half (.12-.78; N=156- many low) | Face validity. Factor analysis based on small sample size. Subscale inter-correlations range from -.38 to .81. Appropriateness of norms is questionable. | A general instrument used by management in determining the stress factors in an environment (Pope, 1992). |
| Teacher Stress Inventory, TSI | Fimian, 1988 | Assesses the degree of occupational stress experienced by teachers. | American Public School Teachers | 11<br>(49; 5 pt L) | TM | Yes | Majority of α's >.80. Need test-retest reliability. | Expert opinion, factor analysis, convergent validity. Norms are poor. | Recommended (Poteat, 1992) |

Table of Commercially Available Time Management Instruments Continued.

| Instrument Title | Author | Purpose | Pop. | Scales (Items) | TM Items | Theoretical Basis / Source for Items | Reliability Evidence | Validity Evidence | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| SKILLSCOPE for Managers | Kaplan, Dalton, Kaplan, Leslie, Moxley, Ohlott, & Van Velsor, 1988. | Assesses managerial strengths and developmental needs from managers and coworkers perspectives. | Managers | 15<br>(98) | TM | No | Mid-high KR-20's. Mid test-retest. | Weak | Do not use to evaluate management effectiveness (Wightman, 1995). |
| Learning and Study Strategies Inventory, LASSI | Weinstein, 1987. | To measure student's use of learning and study strategies and methods. | College Students | 10<br>(77) | TM | Vague | α = .86 for TM; test-retest = .85 for TM | Content (*face*) validity only. | The LASSI lacks statistical evidence regarding discrete scales, criterion-related validity, and construct validity (Blackwell, 1992). |
| Managerial Assessment of Proficiency, MAP | Parry, 1985. | To show a participant's strengths and weaknesses in 12 areas of managerial competency and two dimensions of management style. | Managers | 17<br>(187)<br>6.5 hours | TM within subscale | No | None | Weak | The available reliability and validity evidence fails to meet even the most minimal professional standards for assessment procedures. Fails to meet the regulatory requirements for selection procedures (Kehoe, 1992). |

Table of Commercially Available Time Management Instruments Continued.

| Instrument Title | Author | Purpose | Pop. | Scales (Items) | TM Items | Theoretical Basis / Source for Items | Reliability Evidence | Validity Evidence | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| People Performance Profile, PPP | Crosby, Scherer, & Crosby, 1985. | To diagnose organizational effectiveness across 20 dimensions that are presumed to have impact on productivity and employee satisfaction. | Organization Members | 3<br>(190) | TM within Section III | No | PPP Stability: .95.<br>No reliability is provided for any PPP dimension or subscale scores. | Weak | May be useful in exploratory research.<br>Cannot be recommended as an instrument of demonstrated value (Adler, 1989). |
| Time Use Analyzer | Canfield, 1981 | To clarify the importance of using time effectively in various aspects of life. | Adults | 2<br>(8; 5 pt L) | Typicalness and Usefulness | No | No | No | Lack of critical information about the characteristics of the scale seriously limits general usability of the instrument (Carlson, 2001). |

Table of Commercially Available Time Management Instruments Continued.

| Instrument Title | Author | Purpose | Pop. | Scales (Items) | TM Items | Theoretical Basis / Source for Items | Reliability Evidence | Validity Evidence | Recommendations |
|---|---|---|---|---|---|---|---|---|---|
| Time Perception Inventory, TPI | Canfield, 1976 | To measure perception of time use including degree of personal concern about time usage and frame of reference (past, present, future) used. | Students in TM courses | 4 (18) | Time Effectiveness (10 items; 4 pt L),<br>Orientation (8 items) | No | No | No | The TPI may be used as a discussion starter in seminars on effective time management but does not have a thorough rationale or a sufficiently strong technical base to support inferences of potential effectiveness in job assignments or inferences in diverse populations (McRae, 1992). |

*Note:* D refers to dichotomous items; L refers to Likert-type items; MC refers to multiple choice items; Pop. Refers to population; TM refers to Time Management.

# Appendix E

## Panel Member Review Package

## Time Management Exercise Scale – TIMES

Identification Number ______________________

The TIMES is an instrument intended to measure time management behaviors in relation to exercise participation and adherence. There are many definitions of exercise, however, I would like you use the following definition of exercise to help you complete this questionnaire:

> **Exercise is planned, structured, and involves repetitive bodily movement with the specific *intention* of improving or maintaining one or more components of physical fitness such as aerobic fitness, muscular strength and endurance, body composition, or flexibility (Caspersen, Powell, & Christenson, 1985).**

There is often confusion surrounding the definition of exercise. Here is an example of what is and what is not considered exercise for this study:

"You park your car in a parkade several blocks from your work and walk those blocks to work each weekday because that is the only parkade available. You may be improving or maintaining one or more components of physical fitness in the process but those fitness results are **unintentional**." This **would not** be considered exercise.

"You park your car in a parkade several blocks from your work on purpose and walk those blocks to work each weekday because you want to fit more exercise into your life. You are **intentionally** trying to improve or maintain one or more components of physical fitness in the process." This **would be** considered exercise.

Each of the 91 statements below refers to a time management behavior or reaction. For each item, you will be asked to rate how well the item describes **you** *at this time in your life.*

Read each statement carefully and then using the scale ranging from "Does not describe me at all" to "Describes me very well", check the box (√) that best represents how well the statement describes **you** *at this time in your life.* If you do not perform the time management behavior indicated by the item, check the box: "does not describe me at all". There are no correct or incorrect answers. Your first response is usually the best one.

**EXAMPLE:** I like to go swimming.

| | | | | |
|---|---|---|---|---|
| **DOES NOT DESCRIBE ME AT ALL** | | | | **DESCRIBES ME VERY WELL** |
| ☐ | ☐ | √ | ☐ | ☐ |

| *TIMES Statements* | DOES NOT DESCRIBE ME AT ALL<br>☐ | ☐ | ☐ | ☐ | DESCRIBES ME VERY WELL<br>☐ |
|---|---|---|---|---|---|
| 1. Because I am disorganized I lack the time to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Even when I am pressured for time, I still manage to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. Exercise is not a priority in my life. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. My exercise schedule is inflexible. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. I keep my long term exercise goals in mind when I think about exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. Finding the time to exercise is not important to me. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. I do not like to schedule my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. I accurately estimate the amount of time it takes me to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. I write notes to remind myself to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. My exercise goals are unrealistic. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. Exercise is an important part of my life. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. I keep a progress record of my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. I periodically evaluate my exercise goals to see if they need changing. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. I enjoy organized exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time. | ☐ | ☐ | ☐ | ☐ | ☐ |

| *TIMES Statements* | DOES NOT DESCRIBE ME AT ALL<br>☐ | ☐ | ☐ | ☐ | DESCRIBES ME VERY WELL<br>☐ |
|---|---|---|---|---|---|
| 16. I put off exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. I monitor the amount of exercise I do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 18. I have clear exercise priorities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 19. I use exercise to help me reach other health related goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. I am unwilling to reorganize my time to include exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 21. I feel guilty when I am unable to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. I reserve time in my daily schedule for exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. I record the amount of time I spend exercising in a day-timer or on a calendar. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. I make sure that I exercise regularly. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. I turn down offers to participate in exercise activities because I have no time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 26. I organize my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 27. It is a waste of time to try to schedule my day to include exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 28. I have weekly exercise priorities. | ☐ | ☐ | ☐ | ☐ | ☐ |

| *TIMES Statements* | DOES NOT DESCRIBE ME AT ALL<br>☐ | ☐ | ☐ | ☐ | DESCRIBES ME VERY WELL<br>☐ |
|---|---|---|---|---|---|
| 29. I don't set deadlines for the exercise goals I want to accomplish. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 30. I exercise consistently. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 31. I conserve time throughout the day in order to have time for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32. I feel stressed when I do not find the time to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33. I have difficulty finishing exercise activities once I have started them. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34. I am often late for my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 35. I have a weekly exercise schedule. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36. My exercise schedule is written down. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 37. My exercise goals are unclear. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 38. My exercise routine is inefficient. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 39. When I exercise, I like to do several other tasks simultaneously. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 40. Exercise is among my top priorities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 41. The exercise activities I enjoy are inconvenient because they take up too much time. | ☐ | ☐ | ☐ | ☐ | ☐ |

| *TIMES Statements* | **DOES NOT DESCRIBE ME AT ALL** | | | | **DESCRIBES ME VERY WELL** |
|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ |
| 42. When I exercise, I prefer to focus entirely on the exercise activity. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 43. Most of the time I exercise at the spur of the moment. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 44. I set short term exercise goals for what I want to accomplish each week. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 45. I use a day-timer to block out time for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 46. I do not like structured exercise routines. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 47. I often miss-out on my exercise activities because I am over-committed. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 48. I include exercise activities in my list of priorities for each day. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 49. I don't have long term exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 50. My exercise schedule is irregular. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 51. When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 52. I keep an exercise diary, log, or workbook. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 53. When I exercise, I usually perform my entire exercise activity at one time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 54. I have monthly exercise priorities. | ☐ | ☐ | ☐ | ☐ | ☐ |

| *TIMES Statements* | DOES NOT DESCRIBE ME AT ALL<br>☐ | ☐ | ☐ | ☐ | DESCRIBES ME VERY WELL<br>☐ |
|---|---|---|---|---|---|
| 55. When I am interested in an exercise activity, I find the time to do it. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 56. I'm not serious enough in accomplishing my exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 57. My life is so full that I can't imagine finding time for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 58. I write my exercise goals down. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 59. I schedule my exercise activities at least one week in advance. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 60. I prepare the things I need for my exercise activities ahead of time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 61. I get upset when I miss my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 62. I have short term exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 63. My exercise activities and the time I have for exercise are compatible. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 64. I look for ways to increase the efficiency with which I perform my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 65. I have seasonal exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 66. I set aside a specified amount of time each day for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |

| *TIMES Statements* | **DOES NOT DESCRIBE ME AT ALL**<br>☐ | ☐ | ☐ | ☐ | **DESCRIBES ME VERY WELL**<br>☐ |
|---|---|---|---|---|---|
| 67. I do not value exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 68. I underestimate the time it will take to complete my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 69. I know the type of exercise I prefer. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 70. I include exercise when I develop a priority list. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 71. I often waste my exercise time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 72. I set challenging exercise goals for myself. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 73. I record my exercise sessions on a calendar. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 74. I try to do small amounts of exercise throughout my day. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 75. I have a monthly exercise schedule. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 76. Other people help me find the time for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 77. I check exercise off of my "to do list" as soon as I finish exercising. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 78. I do not know how to prioritize my activities so that I include exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 79. I select exercise activities that I have time for. | ☐ | ☐ | ☐ | ☐ | ☐ |

| *TIMES Statements* | DOES NOT DESCRIBE ME AT ALL<br>☐ | ☐ | ☐ | ☐ | DESCRIBES ME VERY WELL<br>☐ |
|---|---|---|---|---|---|
| 80. My exercise goals are inflexible. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 81. I like to exercise at the same time each day. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 82. I do not schedule time for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 83. I document my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 84. I revise my exercise goals when needed. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 85. I spend too much time exercising. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 86. I check my "to do lists" frequently so I do not forget to exercise.. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 87. I have an exercise routine. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 88. I know the time of day when I prefer to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 89. I often forget to include exercise when I make lists of things to do. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 90. I like to schedule my exercise activities for the same time each day. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 91. I schedule exercise activities at least three times per week. | ☐ | ☐ | ☐ | ☐ | ☐ |

Hypothesized Category Definitions for Time Management Exercise Scale

| Category | Definition |
|---|---|
| Setting Exercise Goals | Goal setting behavior including the setting of personal, long term, short term, specific, challenging, realistic, measurable, and flexible goals related to exercise participation and adherence. |
| Prioritization of Exercise | Focused commitment to exercise, acknowledgement of the importance of exercise relative to other behaviors like job and household chores, and the inclusion of exercise as a priority for the week and month. |
| Scheduling Exercise | Scheduling exercise activities consistently, regularly, monthly, and in advance. |
| Exercise Organization | Exercise-related time organization including the preparation, conservation, efficiency, and partitioning of exercise activities. |
| Awareness of Time and Exercise Suitability | Accuracy in estimating the time required for exercise, time appropriateness and compatibility of chosen exercise activities, time limitations for exercise, and exercise procrastination. |
| Exercise Documentation | Monitoring, recording, and documenting exercise activities through the use of notes, to do lists, calendars, diaries, logs, written schedules, and day-timers. |
| Exercise and Time Management Preferences and Emotions | Chronicity (time) preferences and preferences for exercise organization, routines, structure, and schedules. Feelings of anxiety, guilt, and stress over lack of time for exercise. |

# Item Content Rating Review Form

Reviewer ID Number______________________________ Date:____________________

## Directions

1. Read carefully through the TIMES items. Due to uncertainty regarding the placement of some TIMES items, items may appear in more than one category.

2. Read carefully through the category specifications (definitions).

3. For each item, indicate how well you feel the item reflects the category specification (definition) it was written to measure.

Judge an item solely on the basis of the match between its content and the content defined by the category specifications that the item was intended to measure.

Please use the following five point rating scale shown below:

| 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| NO FIT | | | | EXCELLENT FIT |

For each item, circle the number corresponding to your rating.

**EXAMPLE**

**I like exercise.**

| | | | | |
|---|---|---|---|---|
| **0** | **1** | **2** | **3** | **4** |
| **NO FIT** | | | | **EXCELLENT FIT** |

If you choose "NO FIT" for any item, please provide reasoning for this judgment and indicate with which category this item would fit.

5. Upon completion of steps 1 to 3, please examine the items you have indicated as fitting the category specifications (definitions) with a rating of "3" or "4".

   Do the items you rated as "3" or "4" together represent the specified category? If no, please indicate what items should be added.

6. Please feel free to comment on or to suggest item revisions. For example, if you think an item should be worded differently, please re-write the item in the space provided.

Item Content Rating Review Form

| **Category**<br>Setting Exercise Goals | | **Category Specifications**<br>Goal setting behavior including the setting of personal, long term, short term, specific, challenging, realistic, measurable, and flexible goals related to exercise participation and adherence. | | | | | |
|---|---|---|---|---|---|---|---|
| | | Item Rating Scale:<br>0 "No Fit" | 1 | 2 | 3 | 4 "Excellent Fit" | |
| Item # | Item | Item Rating | | | | | Suggested Item Revisions |
| 1-5 | I keep my long term exercise goals in mind when I think about exercise. | 0 | 1 | 2 | 3 | 4 | |
| 2-10 | My exercise goals are unrealistic. | 0 | 1 | 2 | 3 | 4 | |
| 3-13 | I periodically evaluate my exercise goals to see if they need changing. | 0 | 1 | 2 | 3 | 4 | |
| 4-19 | I use exercise to help me reach other health related goals . | 0 | 1 | 2 | 3 | 4 | |
| 5-29 | I don't set deadlines for the exercise goals I want to accomplish. | 0 | 1 | 2 | 3 | 4 | |
| 6-37 | My exercise goals are unclear. | 0 | 1 | 2 | 3 | 4 | |
| 7-40 | Exercise is among my top priorities. | 0 | 1 | 2 | 3 | 4 | |
| 8-44 | I set short term exercise goals for what I want to accomplish each week. | 0 | 1 | 2 | 3 | 4 | |
| 9-49 | I don't have long term exercise goals. | 0 | 1 | 2 | 3 | 4 | |
| 10-62 | I have short term exercise goals. | 0 | 1 | 2 | 3 | 4 | |
| 11-65 | I have seasonal exercise goals. | 0 | 1 | 2 | 3 | 4 | |
| 12-72 | I set challenging exercise goals for myself. | 0 | 1 | 2 | 3 | 4 | |
| 13-80 | My exercise goals are inflexible. | 0 | 1 | 2 | 3 | 4 | |
| 14-84 | I revise my exercise goals when needed. | 0 | 1 | 2 | 3 | 4 | |

Please examine the items you have indicated as fitting the category specifications with a rating of "3" or "4".

Do the items you rated as "3" or "4" together represent the category Setting Exercise Goals? **YES** **NO**

If **NO**, please indicate what items should be added:

Comments:

Item Content Rating Review Form continued

| **Category**<br>Prioritization of Exercise | | **Category Specifications**<br>Focused commitment to exercise, acknowledgement of the importance of exercise relative to other behaviors like job and household chores, and the inclusion of exercise as a priority for the week and month. | | | | | |
|---|---|---|---|---|---|---|---|
| | | Item Rating Scale:<br>0 "No Fit" 1 2 3 4 "Excellent Fit" | | | | | |
| Item # | Item | Item Rating | | | | | Suggested Item Revisions |
| 1-3 | Exercise is not a priority in my life. | 0 | 1 | 2 | 3 | 4 | |
| 2-6 | Finding the time to exercise is not important to me. | 0 | 1 | 2 | 3 | 4 | |
| 3-11 | Exercise is an important part of my life. | 0 | 1 | 2 | 3 | 4 | |
| 4-18 | I have clear exercise priorities. | 0 | 1 | 2 | 3 | 4 | |
| 5-24 | I make sure that I exercise regularly. | 0 | 1 | 2 | 3 | 4 | |
| 6-28 | I have weekly exercise priorities. | 0 | 1 | 2 | 3 | 4 | |
| 7-40 | Exercise is among my top priorities. | 0 | 1 | 2 | 3 | 4 | |
| 8-48 | I include exercise activities in my list of priorities for each day. | 0 | 1 | 2 | 3 | 4 | |
| 9-54 | I have monthly exercise priorities. | 0 | 1 | 2 | 3 | 4 | |
| 10-56 | I'm not serious enough in accomplishing my exercise goals. | 0 | 1 | 2 | 3 | 4 | |
| 11-67 | I do not value exercise. | 0 | 1 | 2 | 3 | 4 | |
| 12-70 | I include exercise when I develop a priority list. | 0 | 1 | 2 | 3 | 4 | |
| 13-71 | I often waste my exercise time. | 0 | 1 | 2 | 3 | 4 | |
| 14-78 | I do not know how to prioritize my activities to include exercise. | 0 | 1 | 2 | 3 | 4 | |

Please examine the items you have indicated as fitting the category specifications with a rating of "3" or "4".

Do the items you rated as "3" or "4" together represent the category Prioritization of Exercise? **YES** **NO**

If **NO**, please indicate what items should be added:

Item Content Rating Review Form continued

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Category** | | **Category Specifications** | | | | | |
| Scheduling Exercise | | Scheduling exercise activities consistently, regularly, monthly, and in advance. | | | | | |
| | | Item Rating Scale: 0 "No Fit" 1 2 3 4 "Excellent Fit" | | | | | |
| Item # | Item | Item Rating | | | | | Suggested Item Revisions |
| 1-4 | My exercise schedule is inflexible. | 0 | 1 | 2 | 3 | 4 | |
| 2-15 | I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time. | 0 | 1 | 2 | 3 | 4 | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 4-23 | I record the amount of time I spend exercising in a day-timer or on a calendar. | 0 | 1 | 2 | 3 | 4 | |
| 5-27 | It is a waste of time to try to schedule my day to include exercise. | 0 | 1 | 2 | 3 | 4 | |
| 6-30 | I exercise consistently. | 0 | 1 | 2 | 3 | 4 | |
| 7-35 | I have a weekly exercise schedule. | 0 | 1 | 2 | 3 | 4 | |
| 8-43 | Most of the time I exercise at the spur of the moment. | 0 | 1 | 2 | 3 | 4 | |
| 9-50 | My exercise schedule is irregular. | 0 | 1 | 2 | 3 | 4 | |
| 10-59 | I schedule my exercise activities at least one week in advance. | 0 | 1 | 2 | 3 | 4 | |
| 11-66 | I set aside a specified amount of time each day for exercise. | 0 | 1 | 2 | 3 | 4 | |
| 12-75 | I have a monthly exercise schedule. | 0 | 1 | 2 | 3 | 4 | |
| 13-82 | I do not schedule time for exercise. | 0 | 1 | 2 | 3 | 4 | |
| 14-91 | I schedule exercise activities at least three times per week. | 0 | 1 | 2 | 3 | 4 | |

Please examine the items you have indicated as fitting the category specifications with a rating of "3" or "4".
Do the items you rated as "3" or "4" together represent the category Scheduling Exercise? **YES** **NO**

If **NO**, please indicate what items should be added. Comments:

Item Content Rating Review Form continued

| Category | | Category Specifications | | | | | |
|---|---|---|---|---|---|---|---|
| | **Exercise Organization** | **Exercise-related time organization including the preparation, conservation, efficiency, and partitioning of exercise activities.** | | | | | |
| | | Item Rating Scale: 0 "No Fit" 1 2 3 4 "Excellent Fit" | | | | | |
| Item # | Item | Item Rating | | | | | Suggested Item Revisions |
| 1-1 | Because I am disorganized I lack the time to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 2-20 | I am unwilling to reorganize my time to include exercise. | 0 | 1 | 2 | 3 | 4 | |
| 3-26 | I organize my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 4-30 | I exercise consistently. | 0 | 1 | 2 | 3 | 4 | |
| 5-31 | I conserve time throughout the day in order to have time for exercise. | 0 | 1 | 2 | 3 | 4 | |
| 6-34 | I am often late for my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 7-38 | My exercise routine is inefficient. | 0 | 1 | 2 | 3 | 4 | |
| 8-53 | When I exercise, I usually perform my entire exercise activity at one time. | 0 | 1 | 2 | 3 | 4 | |
| 9-60 | I prepare the things I need for my exercise activities ahead of time. | 0 | 1 | 2 | 3 | 4 | |
| 10-64 | I look for ways to increase the efficiency with which I perform my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 11-71 | I often waste my exercise time. | 0 | 1 | 2 | 3 | 4 | |
| 12-74 | I try to do small amounts of exercise throughout my day. | 0 | 1 | 2 | 3 | 4 | |
| 13-76 | Other people help me find the time for exercise. | 0 | 1 | 2 | 3 | 4 | |
| 14-87 | I have an exercise routine. | 0 | 1 | 2 | 3 | 4 | |

Please examine the items you have indicated as fitting the category specifications with a rating of "3" or "4".

Do the items you rated as "3" or "4" together represent the category Exercise Organization? **YES** **NO**

If **NO**, please indicate what items should be added:

Comments:

Item Content Rating Review Form continued

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | **Category**<br>Awareness of Time and Exercise Suitability | **Category Specifications**<br>Accuracy in estimating the time required for exercise, time appropriateness and compatibility of chosen exercise activities, time limitations for exercise, and exercise procrastination. | | | | | |
| | | Item Rating Scale:<br>0 "No Fit" 1 2 3 4 "Excellent Fit" | | | | | |
| Item # | Item | Item Rating | | | | | Suggested Item Revisions |
| 1-2 | Even when I am pressured for time, I still manage to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 2-8 | I accurately estimate the amount of time it takes for me to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 3-16 | I put off exercise. | 0 | 1 | 2 | 3 | 4 | |
| 4-25 | I turn down offers to participate in exercise activities because I have no time. | 0 | 1 | 2 | 3 | 4 | |
| 5-33 | I have difficulty finishing exercise activities once I have started them. | 0 | 1 | 2 | 3 | 4 | |
| 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | 0 | 1 | 2 | 3 | 4 | |
| 7-47 | I often miss-out on my exercise activities because I am over-committed. | 0 | 1 | 2 | 3 | 4 | |
| 8-51 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | 0 | 1 | 2 | 3 | 4 | |
| 9-57 | My life is so full that I can't imagine finding time for exercise. | 0 | 1 | 2 | 3 | 4 | |
| 10-63 | My exercise activities and the time I have for exercise are compatible. | 0 | 1 | 2 | 3 | 4 | |
| 11-68 | I underestimate the time it will take to complete my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 12-69 | I know the type of exercise I prefer. | 0 | 1 | 2 | 3 | 4 | |
| 13-79 | I select exercise activities that I have time for. | 0 | 1 | 2 | 3 | 4 | |
| 14-85 | I spend too much time exercising. | 0 | 1 | 2 | 3 | 4 | |

Please examine the items you have indicated as fitting the category specifications with a rating of "3" or "4".

Do the items you rated as "3" or "4" together represent the category Awareness of Time and Exercise Suitability? **YES** **NO**

If **NO**, please indicate what items should be added: Comments:

Item Content Rating Review Form continued

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Category**<br>Exercise Documentation | | **Specifications**<br>Monitoring, recording and documenting exercise activities through the use of notes, to do lists, calendars, diaries, logs, written schedules, and day-timers. | | | | | |
| | | Item Rating Scale:<br>0 "No Fit" 1 2 3 4 "Excellent Fit" | | | | | |
| Item # | Item | Item Rating | | | | | Suggested Item Revisions |
| 1-9 | I write notes to remind myself to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 2-12 | I keep a progress record of my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 3-17 | I monitor the amount of exercise I do. | 0 | 1 | 2 | 3 | 4 | |
| 4-23 | I record the amount of time I spend exercising in a day-timer or on a calendar. | 0 | 1 | 2 | 3 | 4 | |
| 5-36 | My exercise schedule is written down. | 0 | 1 | 2 | 3 | 4 | |
| 6-45 | I use a day-timer to block out time for exercise. | 0 | 1 | 2 | 3 | 4 | |
| 7-52 | I keep an exercise diary, log, or workbook. | 0 | 1 | 2 | 3 | 4 | |
| 8-58 | I write my exercise goals down. | 0 | 1 | 2 | 3 | 4 | |
| 9-73 | I record my exercise sessions on a calendar. | 0 | 1 | 2 | 3 | 4 | |
| 10-77 | I check exercise off of my to do list as soon as I finish exercising. | 0 | 1 | 2 | 3 | 4 | |
| 11-79 | I select exercise activities that I have time for. | 0 | 1 | 2 | 3 | 4 | |
| 12-83 | I document my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 13-86 | I check my to do lists frequently so I do not forget to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 14-89 | I often forget to include exercise when I make a list of things to do. | 0 | 1 | 2 | 3 | 4 | |

Please examine the items you have indicated as fitting the category specifications with a rating of "3" or "4".

Do the items you rated as "3" or "4" together represent the category Exercise Documentation? **YES** **NO**

If **NO**, please indicate what items should be added:
Comments:

Item Content Rating Review Form continued

| **Category**<br>Exercise and Time Management<br>Preferences and Emotions | | **Specifications**<br>Chronicity (time) preferences and preferences for exercise organization, routines, structure, and schedules. Feelings of anxiety, guilt, and stress over lack of time for exercise. | | | | | |
|---|---|---|---|---|---|---|---|
| | | Item Rating Scale:<br>0 "No Fit" 1 2 3 4 "Excellent Fit" | | | | | |
| Item # | Item | Item Rating | | | | | Suggested Item Revisions |
| 1-7 | I do not like to schedule my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 2-14 | I enjoy organized exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 3-19 | I use exercise to help me reach other health related goals . | 0 | 1 | 2 | 3 | 4 | |
| 4-21 | I feel guilty when I am unable to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 5-32 | I feel stressed when I do not find the time to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 6-39 | When I exercise, I like to do several other tasks simultaneously. | 0 | 1 | 2 | 3 | 4 | |
| 7-42 | When I exercise, I prefer to focus entirely on the exercise activity. | 0 | 1 | 2 | 3 | 4 | |
| 8-46 | I do not like structured exercise routines. | 0 | 1 | 2 | 3 | 4 | |
| 9-55 | When I am interested in the exercise activity, I find the time to do it. | 0 | 1 | 2 | 3 | 4 | |
| 10-61 | I get upset when I miss my exercise activities. | 0 | 1 | 2 | 3 | 4 | |
| 11-69 | I know the type of exercise I prefer. | 0 | 1 | 2 | 3 | 4 | |
| 12-81 | I like to exercise at the same time each day. | 0 | 1 | 2 | 3 | 4 | |
| 13-88 | I know the time of day when I prefer to exercise. | 0 | 1 | 2 | 3 | 4 | |
| 14-90 | I like to schedule my exercise activities for the same time each day. | 0 | 1 | 2 | 3 | 4 | |

Please examine the items you have indicated as fitting the category specifications with a rating of "3" or "4".

Do the items you rated as "3" or "4" together represent the category Preferences and Feeling Towards Exercise and Time Management? **YES**
**NO**

If **NO**, please indicate what items should be added:
Comments:

## Item Content Review Questions

1. Given your knowledge, understanding, and experience with time management for exercise participation and adherence, do you think that the TIMES items overall are clear and free of any irrelevant material?

   **YES** **NO** (Please circle one)

   If "no", please explain:________________________________________

2. Do you have any experience working with, teaching, or supervising undergraduate university students?

   **YES** **NO** (Please circle one)

   If "yes", given your experience with undergraduate students, do you think that the reading level of these items is appropriate for undergraduate students?

   **YES** **NO** (Please circle one)

   If "no", please explain:________________________________________

3. Do you have any experience working with, teaching, or counselling people who want to initiate an exercise program?

   **YES** **NO** (Please circle one)

   If "yes", given your experience, do you think that the reading level of these items is appropriate for people who want to initiate an exercise program?

   **YES** **NO** (Please circle one)

   If "no", please explain:________________________________________

4. Do you have any experience working with, teaching, or counselling people who want to maintain or increase their exercise program?

**YES** **NO** (Please circle one)

If "yes", given your experience, do you think that the reading level of these items is appropriate for people who want to maintain or increase their exercise program?

**YES** **NO** (Please circle one)

If "no", please explain:________________________________________

5. Given your knowledge, understanding, and experience with time management for exercise participation and adherence, do you think that any of the seven categories should be combined?

**YES** **NO** (Please circle one)

If "yes", please explain:________________________________________

6. Given your knowledge, understanding, and experience with time management for exercise participation and adherence, do you think there are any missing categories that should be included?

**YES** **NO** (Please circle one)

If "yes", please explain:________________________________________

**Please feel free to add any comments you may have:**

## Background Information

Identification Number:______________________________

1. What is your gender?

(a) Female (b) Male (Please circle one)

2. What is your highest level of education? ______________________

3. Do you have any experience with exercise participation and adherence?

(a) Yes (b) No (Please circle one)

If "yes", what type of experience with exercise participation and adherence have you had? Please explain.______________________________

How many years of experience do you have with exercise participation and adherence? ______________________________

4. Do you have any experience with fitness/exercise counseling?

(a) Yes (b) No (Please circle one)

If "yes", what type of experience with fitness/exercise counseling have you had? Please explain. ______________________________

How many years of experience do you have with fitness/exercise counseling?
______________________________

5. Do you have any formal time management experience (i.e., classes, workshops or seminars) taken?

(a) Yes (b) No (Please circle one)

If "yes", please explain.______________________________

6. Do you have any informal time management training (i.e. books, videos)?

(a) Yes (b) No (Please circle one)

If "yes", please explain.

7. If you are an academic, have you conducted research or published research relating to the field of exercise participation or exercise adherence?

(a) Yes (b) No (Please circle one)

If "yes", please provide reference(s).

8. Please feel free to provide any additional information about your experiences with exercise participation and adherence.

9. Please feel free to provide any additional information about your experiences with time management.

**Thank-you very much for your time and cooperation.**

If you have any further questions, please do not hesitate to contact:
Laurie Hellsten at (780) 492-5427

# Appendix F

## Tables of Panel Members' Ratings

Table of Panel Members' Ratings of Each Item Within Each Subscale

| | Setting Exercise Goals | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Items | | | | | | | | | | | | | |
| **Judge** | **1-5** | **2-10** | **3-13** | **4-19** | **5-29** | **6-37** | **7-40*** | **8-44** | **9-49** | **10-62** | **11-65** | **12-72** | **13-80** | **14-84** |
| **1** | 4 | 3 | 4 | 3 | 4 | 3 | 2 | 4 | 3 | 4 | 4 | 3 | 2 | – |
| **2** | 3 | 4 | 4 | 1 | 2 | 4 | 1 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| **3** | 0 | 3 | 1 | 1 | 3 | 3 | 0 | 4 | 3 | 4 | 2 | 4 | 1 | 1 |
| **4** | 1 | 2 | 4 | 0 | 3 | 0 | 0 | 4 | 3 | 3 | 3 | 4 | 2 | 4 |
| **5** | 3 | 4 | 4 | 4 | 4 | 4 | 0 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |
| **6** | 2 | 3 | 2 | 0 | 2 | 3 | 0 | 4 | 3 | 4 | 3 | 4 | 4 | 3 |
| **7** | 2 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 3 | 4 |
| **8** | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **9** | 4 | 4 | 4 | 1 | 1 | – | – | 4 | 4 | 4 | 4 | 4 | – | 4 |
| **10** | 4 | 3 | 4 | 2 | 4 | 3 | 2 | 4 | 4 | 4 | 4 | 4 | 3 | 4 |

*Note.* Items are identified by subscale number and overall number and *include* lie items, i.e., SEG 2-10 refers to the second SEG item and is the 10th item of the TIMES. * refers to the lie item. - refers to no rating provided by panel member.

Table of Panel Members' Ratings of Each Item Within Each Subscale

| Prioritization of Exercise | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Items | | | | | | | | | | | | | |
| **Judge** | **1-3** | **2-6** | **3-11** | **4-18** | **5-24** | **6-28** | **7-40** | **8-48** | **9-54** | **10-56** | **11-67** | **12-70** | **13-71*** | **14-78** |
| **1** | 4 | 3 | 3 | 4 | 3 | 4 | 4 | 3 | 4 | – | 4 | 4 | 3 | 2 |
| **2** | 4 | 4 | 4 | 4 | 1 | 1 | 4 | 4 | 1 | 1 | 2 | 4 | 1 | 2 |
| **3** | 3 | 3 | 4 | 1 | 4 | 1 | 4 | 2 | 1 | 1 | 4 | 3 | 2 | 1 |
| **4** | – | – | 3 | – | 4 | 2 | 4 | 4 | 2 | 0 | 1 | 1 | 1 | 1 |
| **5** | 4 | 4 | 4 | 4 | 0 | 3 | 4 | 4 | 4 | 3 | 3 | 4 | 4 | 4 |
| **6** | 4 | 4 | 4 | 4 | – | 0 | 4 | – | 0 | 0 | 0 | 4 | 0 | 2 |
| **7** | 4 | 3 | 4 | 3 | 2 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 1 | 3 |
| **8** | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 3 | 4 | 1 | 2 |
| **9** | 4 | 4 | 4 | – | 0 | 0 | 4 | 4 | – | 0 | 0 | 4 | 0 | 4 |
| **10** | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 2 | 4 | 2 | 3 |

*Note.* Items are identified by subscale number and overall number and *include* lie items, i.e., EP 2-6 refers to the second EP item and is the 6th item of the TIMES. * refers to the lie item. - refers to no rating provided by panel member.

Table of Panel Members' Ratings of Each Item Within Each Subscale

**Scheduling Exercise**

**Items**

| Judge | 1-4 | 2-15 | 3-22 | 4-23* | 5-27 | 6-30 | 7-35 | 8-43 | 9-50 | 10-59 | 11-66 | 12-75 | 13-82 | 14-91 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 4 | 4 | 4 | 1 | 3 | 0 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| **2** | 4 | 4 | 4 | 3 | 3 | 0 | 4 | 3 | 4 | 4 | 4 | 3 | 4 | 1 |
| **3** | 3 | 0 | 4 | 0 | 3 | 1 | 4 | 1 | 1 | 4 | 3 | 1 | – | 3 |
| **4** | 1 | 2 | 4 | 1 | 2 | 0 | – | 3 | 0 | 4 | 4 | – | – | 2 |
| **5** | 3 | 4 | 0 | 0 | 4 | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| **6** | 0 | 4 | 4 | 0 | 0 | 0 | 0 | 4 | 3 | 4 | 4 | 0 | 4 | 0 |
| **7** | 2 | 3 | 4 | 4 | 3 | 0 | 4 | 2.5[a] | 3 | 4 | 4 | 4 | 3 | 4 |
| **8** | 4 | 3 | 4 | 4 | 2 | 2 | 4 | 2 | 2 | 4 | 4 | 4 | 3 | 4 |
| **9** | 4 | 2 | 4 | 0 | 0 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| **10** | 3 | 4 | 4 | 4 | 2 | 2 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |

*Note.* Items are identified by subscale number and overall number and *include* lie items, i.e., SE 2-15 refers to the second SE item and is the 15th item of the TIMES. * refers to the lie item. - refers to no rating provided by panel member. [a] this score was explicitly stated by judge 7.

Table of Panel Members' Ratings of Each Item Within Each Subscale

**Exercise Organization**

| | Items | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Judge** | **1-1** | **2-20** | **3-26** | **4-30*** | **5-31** | **6-34** | **7-38** | **8-53** | **9-60** | **10-64** | **11-71** | **12-74** | **13-76** | **14-87** |
| **1** | 3 | 4 | 3 | 0 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 3 | 4 |
| **2** | 4 | 3 | 1 | – | 2 | 2 | 2 | 2 | 4 | 3 | 3 | 2 | 2 | 2 |
| **3** | 3 | 0 | 1 | 1 | 4 | 1 | 1 | 1 | 3 | 1 | 0 | 1 | 1 | 1 |
| **4** | 2 | 1 | 4 | 1 | 1 | 1 | 2 | – | 4 | 3 | 2 | 0 | 1 | 4 |
| **5** | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 0 | 4 | 4 | 4 | 3 | 2 | 4 |
| **6** | 3 | 1 | 3 | 0 | 4 | 0 | 4 | 3 | 4 | 3 | 2 | 2 | 2 | 3 |
| **7** | 3 | 4 | 1 | 3 | 3 | 4 | 4 | 3 | 4 | 4 | 3 | 3 | 2 | 3 |
| **8** | 2 | 2 | 4 | 3 | 4 | 2 | 2 | 3 | 4 | 4 | 3 | 3 | 2 | 4 |
| **9** | 4 | 4 | – | – | – | – | – | – | 4 | – | – | – | – | 4 |
| **10** | 3 | 3 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 2 | 0 |

*Note.* Items are identified by subscale number and overall number and *include* lie items, i.e., EO 2-20 refers to the second EO item and is the 20th item of the TIMES. * refers to the lie item. - refers to no rating provided by panel member.

Table of Panel Members' Ratings of Each Item Within Each Subscale

| | Awareness of Time and Exercise Suitability | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Items | | | | | | | | | | | | | |
| **Judge** | **1-2** | **2-8** | **3-16** | **4-25** | **5-33** | **6-41** | **7-47** | **8-51** | **9-57** | **10-63** | **11-68** | **12-69*** | **13-79** | **14-85** |
| **1** | 3 | 4 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 2 | 4 | 4 |
| **2** | 3 | 4 | 1 | 4 | 3 | 4 | 3 | 3 | 3 | 4 | 4 | 3 | 4 | 4 |
| **3** | 3 | 4 | 1 | 1 | 1 | 2 | 0 | 3 | 0 | 1 | 1 | 4 | 3 | 1 |
| **4** | 2 | 4 | 2 | 1 | 3 | 3 | 2 | 3 | 2 | 3 | 4 | 1 | 4 | 1 |
| **5** | 4 | 4 | 0 | 0 | 0 | 3 | 3 | 3 | 0 | 3 | 3 | 0 | 3 | 3 |
| **6** | 2 | 3 | 0 | 0 | 3 | 2 | 3 | 0 | 3 | 4 | 4 | 0 | 3 | 2 |
| **7** | 3 | 4 | 1 | 3 | 3 | 4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| **8** | 3 | 4 | 3 | 2 | 3 | 2 | 2 | 3 | 2 | 4 | 4 | 4 | 4 | 3 |
| **9** | 0 | 3 | 0 | 2 | – | – | – | – | 1 | – | – | – | – | – |
| **10** | 4 | 4 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 4 | 3 | 4 | 4 | 2 |

*Note.* Items are identified by subscale number and overall number and *include* lie items, i.e., ATES 2-8 refers to the second ATES item and is the 8th item of the TIMES. * refers to the lie item. - refers to no rating provided by panel member.

Table of Panel Members' Ratings of Each Item Within Each Subscale

**Exercise Documentation**

**Items**

| Judge | 1-9 | 2-12 | 3-17 | 4-23 | 5-36 | 6-45 | 7-52 | 8-58 | 9-73 | 10-77 | 11-79* | 12-83 | 13-86 | 14-89 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 4 | 3 | 3 |
| 2 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 0 | 4 | 4 | 4 |
| 3 | 1 | 2 | 2 | 4 | 3 | 4 | 4 | 0 | 1 | 1 | 0 | 2 | 1 | 1 |
| 4 | 4 | 4 | 2 | 4 | 3 | 4 | 4 | 2 | 4 | 3 | 1 | 3 | 2 | 3 |
| 5 | 3 | 4 | 4 | 4 | 4 | 4 | 0 | 4 | 3 | 4 | 4 | 4 | 4 | 4 |
| 6 | 0 | 4 | 4 | 4 | 0 | 0 | 4 | 2 | 4 | 4 | 0 | 4 | 0 | 0 |
| 7 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 3 | 4 | 3 | 0 | 3 | 3 | 4 |
| 8 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 4 | 4 | 3 |
| 9 | 0 | 0 | 4 | 4 | 0 | 0 | 4 | 0 | 4 | 0 | 0 | 0 | – | 0 |
| 10 | 2 | 4 | 4 | 4 | 2 | 2 | 4 | 3 | 3 | 4 | 2 | 4 | 2 | 2 |

*Note:* Items are identified by subscale number and overall number and *include* lie items, i.e., ED 2-12 refers to the second ED item and is the 12th item of the TIMES. * refers to the lie item. - refers to no rating provided by panel member.

Table of Panel Members' Ratings of Each Item Within Each Subscale

**Exercise and Time Management Preferences and Emotions**

| | Items | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Judge** | **1-7** | **2-14** | **3-19*** | **4-21** | **5-32** | **6-39** | **7-42** | **8-46** | **9-55** | **10-61** | **11-69** | **12-81** | **13-88** | **14-90** |
| **1** | 4 | 0 | 0 | 0 | 0 | 4 | 3 | 3 | 3 | 0 | 3 | 4 | 4 | 4 |
| **2** | 3 | 3 | 3 | 4 | 4 | 0 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| **3** | 3 | 1 | 1 | 4 | 3 | 1 | 1 | 1 | 1 | 3 | 1 | 1 | 3 | 1 |
| **4** | 2 | 3 | 1 | 3 | 4 | 0 | 2 | 2 | 2 | 3 | 1 | 3 | 3 | 3 |
| **5** | 3 | 4 | 4 | 4 | 4 | 0 | 4 | 0 | 3 | 4 | 4 | 4 | 4 | 4 |
| **6** | 3 | 3 | 1 | 3 | 3 | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| **7** | 4 | 4 | 1 | 3 | 4 | 0 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 3 |
| **8** | 3 | 3 | 2 | 4 | 4 | 0 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 |
| **9** | 4 | 0 | 0 | 4 | – | – | – | – | – | – | – | – | – | – |
| **10** | 3 | 4 | 2 | 4 | 4 | 3 | 4 | 3 | 3 | 4 | 4 | 4 | 4 | 3 |

*Note.* Items are identified by subscale number and overall number and *include* lie items, i.e., ETMPE 2-14 refers to the second ETMPE item and is the 14th item of the TIMES. * refers to the lie item. - refers to no rating provided by panel member.

# Appendix G

## Pilot Study Sample Package

## Item Clarity Rating Form

Identification Number:______________________________Date:________________

1. Please read carefully through the TIMES items.
2. For each item, indicate if you feel the item's reading level is appropriate for an undergraduate university student by writing a **Y** for Yes or an **N** for No in the first column.
3. In the second column, include any comments that you may have about the reading level of the item.
4. For each item, indicate if you feel the item is clear and free of irrelevant material by writing a **Y** for Yes or an **N** for No in the third column.
5. In the last column, include any comments you may have about the clarity of the item.

An example of the reading level and item clarity rating form is provided below:

**Example Item: I like exercise and sports.**

| Reading Level Yes/No | Comments | Item Clarity Yes/No | Comments |
|---|---|---|---|
| **Y** | - | **N** | **Need to ask about sports and exercise separately.** |

Item Clarity Rating Form

| Category<br>Setting Exercise Goals | | Reading Level Y/N | Comments | Item Clarity Y/N | Comments |
|---|---|---|---|---|---|
| Item # | Item | | | | |
| 1-5 | I keep my long term exercise goals in mind when I think about exercise. | | | | |
| 2-10 | My exercise goals are unrealistic. | | | | |
| 3-13 | I periodically evaluate my exercise goals to see if they need changing. | | | | |
| 4-19 | I use exercise to help me reach other health related goals. | | | | |
| 5-29 | I don't set deadlines for the exercise goals I want to accomplish. | | | | |
| 6-37 | My exercise goals are unclear. | | | | |
| 7-44 | I set short term exercise goals for what I want to accomplish each week. | | | | |
| 8-49 | I don't have long term exercise goals. | | | | |
| 9-62 | I have short term exercise goals. | | | | |
| 10-65 | I have seasonal exercise goals. | | | | |
| 11-72 | I set challenging exercise goals for myself. | | | | |
| 12-80 | My exercise goals are inflexible. | | | | |
| 13-84 | I review my exercise goals when needed. | | | | |

Item Clarity Rating Form continued

| Category<br>Prioritization of Exercise | | Reading Level Y/N | Comments | Item Clarity Y/N | Comments |
|---|---|---|---|---|---|
| Item # | Item | | | | |
| 1-3 | Exercise is not a priority in my life. | | | | |
| 2-6 | Finding the time to exercise is not important to me. | | | | |
| 3-11 | Exercise is an important part of my life. | | | | |
| 4-18 | I have clear exercise priorities. | | | | |
| 5-24 | I make sure that I exercise regularly. | | | | |
| 6-28 | I have weekly exercise priorities. | | | | |
| 7-40 | Exercise is among my top priorities. | | | | |
| 8-48 | I include exercise activities in my list of priorities for each day. | | | | |
| 9-54 | I have monthly exercise priorities. | | | | |
| 10-56 | I'm not serious enough in accomplishing my exercise goals. | | | | |
| 11-67 | I do not value exercise. | | | | |
| 12-70 | I include exercise when I develop a priority list. | | | | |
| 13-78 | I do not know how to prioritize my activities to include exercise. | | | | |

Item Clarity Rating Form continued

| Category<br>**Scheduling Exercise** | | Reading Level Y/N | Comments | Item Clarity Y/N | Comments |
|---|---|---|---|---|---|
| Item # | Item | | | | |
| 1-4 | My exercise schedule is inflexible. | | | | |
| 2-15 | I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time. | | | | |
| 3-22 | I reserve time in my daily schedule for exercise activities. | | | | |
| 4-27 | It is a waste of time to try to schedule my day to include exercise. | | | | |
| 5-30 | I exercise consistently. | | | | |
| 6-35 | I have a weekly exercise schedule. | | | | |
| 7-43 | Most of the time I exercise at the spur of the moment. | | | | |
| 8-50 | My exercise schedule is irregular. | | | | |
| 9-59 | I schedule my exercise activities at least one week in advance. | | | | |
| 10-66 | I set aside a specified amount of time each day for exercise. | | | | |
| 11-75 | I have a monthly exercise schedule. | | | | |
| 12-82 | I do not schedule time for exercise. | | | | |
| 13-91 | I schedule exercise activities at least three times per week. | | | | |

Item Clarity Rating Form continued

| Category<br>**Exercise Organization** | | Reading Level Y/N | Comments | Item Clarity Y/N | Comments |
|---|---|---|---|---|---|
| Item # | Item | | | | |
| 1-1 | Because I am disorganized I lack the time to exercise. | | | | |
| 2-20 | I am unwilling to reorganize my time to include exercise. | | | | |
| 3-26 | I organize my exercise activities. | | | | |
| 4-31 | I conserve time throughout the day in order to have time for exercise. | | | | |
| 5-34 | I am often late for my exercise activities. | | | | |
| 6-38 | My exercise routine is inefficient. | | | | |
| 7-53 | When I exercise, I usually perform my entire exercise activity at one time. | | | | |
| 8-60 | I prepare the things I need for my exercise activities ahead of time. | | | | |
| 9-64 | I look for ways to increase the efficiency with which I perform my exercise activities. | | | | |
| 10-71 | I often waste my exercise time. | | | | |
| 11-74 | I try to do small amounts of exercise throughout my day. | | | | |
| 12-76 | Other people help me find the time for exercise. | | | | |
| 13-87 | I have an exercise routine. | | | | |

Item Clarity Rating Form continued

| Category<br>Awareness of Time and Exercise Suitability | | Reading Level Y/N | Comments | Item Clarity Y/N | Comments |
|---|---|---|---|---|---|
| Item # | Item | | | | |
| 1-2 | Even when I am pressured for time, I still manage to exercise. | | | | |
| 2-8 | I accurately estimate the amount of time it takes for me to exercise. | | | | |
| 3-16 | I put off exercise. | | | | |
| 4-25 | I turn down offers to participate in exercise activities because I have no time. | | | | |
| 5-33 | I have difficulty finishing exercise activities once I have started them. | | | | |
| 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | | | | |
| 7-47 | I often miss-out on my exercise activities because I am over-committed. | | | | |
| 8-51 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | | | | |
| 9-57 | My life is so full that I can't imagine finding time for exercise. | | | | |
| 10-63 | My exercise activities and the time I have for exercise are compatible. | | | | |
| 11-68 | I underestimate the time it will take to complete my exercise activities. | | | | |
| 12-79 | I select exercise activities that I have time for. | | | | |
| 13-85 | I spend too much time exercising. | | | | |

Item Clarity Rating Form continued

| Category<br>**Exercise Documentation** | | **Reading Level Y/N** | **Comments** | **Item Clarity Y/N** | **Comments** |
|---|---|---|---|---|---|
| Item # | Item | | | | |
| 1-9 | I write notes to remind myself to exercise. | | | | |
| 2-12 | I keep a progress record of my exercise activities. | | | | |
| 3-17 | I monitor the amount of exercise I do. | | | | |
| 4-23 | I record the amount of time I spend exercising in a day-timer or on a calendar. | | | | |
| 5-36 | My exercise schedule is written down. | | | | |
| 6-45 | I use a day-timer to block out time for exercise. | | | | |
| 7-52 | I keep an exercise diary, log, or workbook. | | | | |
| 8-58 | I write my exercise goals down. | | | | |
| 9-73 | I record my exercise sessions on a calendar. | | | | |
| 10-77 | I check exercise off of my to do list as soon as I finish exercising. | | | | |
| 11-83 | I document my exercise activities. | | | | |
| 12-86 | I check my to do lists frequently so I do not forget to exercise. | | | | |
| 13-89 | I often forget to include exercise when I make a list of things to do. | | | | |

Item Clarity Rating Form continued

| Category<br>**Preferences and Feelings Toward Time Management For Exercise** | | **Reading Level Y/N** | **Comments** | **Item Clarity Y/N** | **Comments** |
|---|---|---|---|---|---|
| Item # | Item | | | | |
| 1-7 | I do not like to schedule my exercise activities. | | | | |
| 2-14 | I enjoy organized exercise activities. | | | | |
| 3-21 | I feel guilty when I am unable to exercise. | | | | |
| 4-32 | I feel stressed when I do not find the time to exercise. | | | | |
| 5-39 | When I exercise, I like to do several other tasks simultaneously. | | | | |
| 6-42 | When I exercise, I prefer to focus entirely on the exercise activity. | | | | |
| 7-46 | I do not like structured exercise routines. | | | | |
| 8-55 | When I am interested in the exercise activity, I find the time to do it. | | | | |
| 9-61 | I get upset when I miss my exercise activities. | | | | |
| 10-69 | I know the type of exercise I prefer. | | | | |
| 11-81 | I like to exercise at the same time each day. | | | | |
| 12-88 | I know the time of day when I prefer to exercise. | | | | |
| 13-90 | I like to schedule my exercise activities for the same time each day. | | | | |

Instructions Clarity Rating Form

Identification Number:__________________________ Date:_________________

The initial instructions for completing the TIMES are presented in the box below. Please read the instructions carefully.

**TIMES Instructions**

The TIMES is an instrument intended to measure time management behaviors in relation to exercise participation and adherence. There are many definitions of exercise, however, I would like you use the following definition of exercise to help you complete this questionnaire:

**Exercise is planned, structured, and involves repetitive bodily movement with the specific *intention* of improving or maintaining one or more components of physical fitness such as aerobic fitness, muscular strength and endurance, body composition, or flexibility (Caspersen, Powell, & Christenson, 1985).**

There is often confusion surrounding the definition of exercise. Here is an example of what is and what is not considered exercise for this study:

"You park your car in a parkade several blocks from your work and walk those blocks to work each weekday because that is the only parkade available. You may be improving or maintaining one or more components of physical fitness in the process but those fitness results are **unintentional**." This **would not** be considered exercise.

"You park your car in a parkade several blocks from your work on purpose and walk those blocks to work each weekday because you want to fit more exercise into your life. You are **intentionally** trying to improve or maintain one or more components of physical fitness in the process." This **would be** considered exercise.

Each of the 91 statements below refers to a time management behavior or reaction. For each item, you will be asked to rate how well the item describes **you** *at this time in your life.*

Read each statement carefully and then using the scale ranging from "Does not describe me at all" to "Describes me very well", check the box (√) that best represents how well the statement describes **you** *at this time in your life.* If you do not perform the time management behavior indicated by the item, check the box: "does not describe me at all". There are no correct or incorrect answers. Your first response is usually the best one.

**EXAMPLE:** I like to go swimming.

| **DOES NOT DESCRIBE ME AT ALL** | | | | **DESCRIBES ME VERY WELL** |
|---|---|---|---|---|
| ☐ | ☐ | √ | ☐ | ☐ |

Is the reading level of the TIMES instructions appropriate for an undergraduate university student?

(a) **Yes** (please circle one)
**(b)** **No**

If "no", please explain:

Are the TIMES instructions stated clearly?

(a) **Yes** (please circle one)
**(b)** **No**

If "no", please explain:

Are the TIMES instructions free of any irrelevant material?

(a) **Yes** (please circle one)
**(b)** **No**

If "no", please explain:

**Additional Comments:**

## TIMES Response Format Rating Form

Now please examine the response format of the TIMES presented in the box below.

**Response Format:**

| | | | | |
|---|---|---|---|---|
| **DOES NOT DESCRIBE ME AT ALL** | | | | **DESCRIBES ME VERY WELL** |
| ☐ | ☐ | √ | ☐ | ☐ |

1. Is the response format of the TIMES clear?

(a) **Yes** (please circle one)
**(b) No**

If "no", please explain:

Additional Comments:

## Background Information

Identification Number:______________________________

1. What is your gender?

(a) Female (b) Male (please circle one)

2. What is your date of birth? (Day/Month/Year) ____________________

3. What is your highest level of education? ____________________

4. What is your registration status?

(a) Full-time (3 or more courses per term) (please circle one)

(b) Part-time (less than 3 courses per term)

5. Do you have any formal time management experience (i.e. classes, workshops or seminars taken)?

(a) Yes (b) No (please circle one)

If "yes", please explain.

______________________________________________

______________________________________________

______________________________________________

______________________________________________

______________________________________________

______________________________________________

6. Do you have any informal time management training (i.e. books, videos)?

(a) Yes (b) No (please circle one)

If "yes", please explain.

______________________________________________

______________________________________________

______________________________________________

______________________________________________

______________________________________________

______________________________________________

**Thank-you very much for your time and cooperation.**

# Appendix H

## Empirical Validation Package

## Time Management Exercise Scale – TIMES

Identification Number ________________________

The TIMES is an instrument intended to measure time management behaviors in relation to exercise. There are many definitions of exercise, however, I would like you use the following definition of exercise to help you complete this instrument:

> **Exercise is planned, structured, and involves repetitive bodily movement with the specific *intention* of improving or maintaining one or more components of physical fitness such as aerobic fitness, muscular strength and endurance, body composition, or flexibility (Caspersen, Powell, & Christenson, 1985).**

There is often confusion surrounding the definition of exercise. Here is an example of what is and what is not considered exercise for this study:

"You park your car in a parkade several blocks from your work and walk those blocks to work each weekday because that is the only parkade available. You may be improving or maintaining one or more components of physical fitness in the process but those fitness results are **unintentional**." This **would not** be considered exercise.

"You park your car in a parkade several blocks from your work on purpose and walk those blocks to work each weekday because you want to fit more exercise into your life. You are **intentionally** trying to improve or maintain one or more components of physical fitness in the process." This **would be** considered exercise.

Each of the 91 statements below refers to a time management behavior or reaction. For each item, you will be asked to rate how well the item describes **you** *at this time in your life*.

Read each statement carefully and then using the scale ranging from "Does not describe me at all" to "Describes me very well", check the box (√) that best represents how well the statement describes **you** *at this time in your life*. If you do not perform the time management behavior indicated by the item, check the box: "does not describe me at all". There are no correct or incorrect answers. Your first response is usually the best one.

**EXAMPLE:** I like to go swimming.

| **DOES NOT DESCRIBE ME AT ALL** | | | | **DESCRIBES ME VERY WELL** |
|---|---|---|---|---|
| ☐ | ☐ | √ | ☐ | ☐ |

## Background Information

Identification Number:________________________________

1. What is your gender? (please circle one)

(a) Female (b) Male

2. What is your date of birth? (Day/Month/Year)________________________

3. What is your highest level of education? (please circle one)

(a) High School (b) Some university
(c) BSc. (d) B.A.
(e) Master's (f) Ph.D.
(g) Other Please specify ______________________________

4. What is your marital status? (please circle one)

(a) Never Married (b) Married
(c) Common Law (d) Separated
(e) Divorced (f) Widowed

5. What is your registration status at the University of Alberta? (please circle one)

(a) Full-time (3 or more courses per term)
(b) Part-time (less than 3 courses per term)

5. Are you currently employed (paid employment)? (please circle one)

(a) Yes
(b) No

If "yes", where? ______________________________

If "yes", how many hours per week do you work? (please circle one)

(a) None (b) 1 - 5 hours
(c) 6 - 10 hours (d) 11 - 15 hours
(e) 16 - 20 hours (f) 21 - 25 hours
(g) 26 - 30 hours (h) 31 - 35 hours
(i) 36 - 40 hours (j) more than 40 hours

6. Do you currently do any volunteer work? (please circle one)

(a) Yes
(b) No

If "yes", how many hours per week do you work? (please circle one)

(a) None
(b) 1 - 5 hours
(c) 6 - 10 hours
(d) 11 - 15 hours
(e) 16 - 20 hours
(f) 21 - 25 hours
(g) 26 - 30 hours
(h) 31 - 35 hours
(i) 36 - 40 hours
(j) more than 40 hours

7. How many hours per week do you spend studying? (please circle one)

(a) None
(b) 1 - 5 hours
(c) 6 - 10 hours
(d) 11 - 15 hours
(e) 16 - 20 hours
(f) 21 - 25 hours
(g) 26 - 30 hours
(h) 31 - 35 hours
(i) 36 - 40 hours
(j) more than 40 hours

8. Do you have any formal time management experience (i.e. workshops/seminars)?
(a) Yes (please circle one)
(b) No

If "yes", circle all that apply:

(a) workshops/seminars offered by University of Alberta
(b) workshops/seminars offered by your employer
(c) off-campus workshops/seminars
(d) other; please explain ____________________
____________________
____________________
____________________

9. Do you have any informal time management training (i.e. books/videos)?

(a) Yes (please circle one)
(b) No

If "yes", circle all that apply:

(a) read books on time management
(b) watched videos on time management
(c) watched television programs (i.e. knowledge network, OPRAH)
(d) other; please explain ____________________
____________________
____________________
____________________

10. Please think about the past 4 months. Now consider a typical week (7 days) during the past 4 months. How many times, on the average, did you do the following kinds of exercise for more than 15 minutes during your free time?

When answering these questions please remember to:

- ➤ consider a typical (average) week during the past 4 months.
- ➤ only count exercise sessions that lasted 15 minutes or longer in duration.
- ➤ only count exercise that was done during free time (not occupation or housework).
- ➤ note that the main difference between the 3 categories is the intensity of the activity.

TIMES PER WEEK

a. STRENUOUS EXERCISE
(HEART BEATS RAPIDLY, BREATHING HEAVY) __________

b. MODERATE EXERCISE
(HEART BEAT ACCELERATES, NOT EXHAUSTING) __________

c. MILD EXERCISE
(HEART RATE NORMAL, MINIMAL EFFORT) __________

11. The following questions ask you about your preferences for exercise activities. Please answer all questions even if you do not currently exercise. Be sure to answer the questions based on what you **prefer** to do and not necessarily what you **actually** do. Circle only one response for each question unless otherwise indicated.

a) I prefer to exercise:

(1) Alone
(2) With a friend/partner
(3) With a few people
(4) In a group (e.g. with friends, in a class, with a team)

b) I prefer to exercise:

(1) At home
(2) At a fitness club/exercise facility
(3) Outdoors
(4) At the location of my preferred exercise activity
(e.g. arena, soccer complex, yoga studio)
(5) Other; please specify ______________________

c) My preferred exercise activity is: (circle all that apply)

(1) Aerobics
(2) Jogging
(3) Swimming
(4) Weight Training
(5) Body Building
(6) Bicycling
(7) Skating/Rollerblading
(8) Walking
(9) Other Individual Sport
(10) Pair/Duo Sport
(10) Team Sport
(11) Other; please specify ______________________

d) I prefer my exercise to be: (circle all that apply)

(1) unsupervised (e.g. go for a walk or a swim)
(2) instructed/coached (e.g. play a sport, attend a class)
(3) competitive
(4) recreational
(5) spontaneous/flexible
(6) regularly scheduled (e.g. aerobics class on Tuesdays/Thursdays)

e) I prefer my exercise intensity to be:

(1) Low
(2) Moderate
(3) High

12. The following questions ask you about your *plans or intentions* for exercise over the next four months. Please focus on what you currently plan to do and not necessarily on what you think might happen.

a) I intend to exercise regularly (at least 3 times per week) during the next four months. (Circle the appropriate response)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|
| Strongly Disagree | Moderately Disagree | Slightly Disagree | | Slightly Agree | Moderately Agree | Strongly Agree |

b) I intend to exercise at least _________times per week during the next four months. (Fill in a number in the space provided)

c) I intend to exercise with the following regularity during the next four months. (Check the appropriate box)

Not at all Every Day

d) I intend to exercise at least 3 times per week over the next four months. (Check the appropriate box)

Definitely Definitely Not

13. The following is a list of motives or reasons that people often give for exercising. Please evaluate each item on the list for the degree to which it would be an important motive or reason for you to exercise. Please use the following scale to guide your responses.

| | | | | |
|---|---|---|---|---|
| 1<br>minor<br>importance | 2 | 3<br>moderate<br>importance | 4 | 5<br>major<br>importance |

How important would each of the following reasons in your decision to exercise?

| | | | | | |
|---|---|---|---|---|---|
| 1. Fitness and health | 1 | 2 | 3 | 4 | 5 |
| 2. Physical appearance | 1 | 2 | 3 | 4 | 5 |
| 3. Weight control | 1 | 2 | 3 | 4 | 5 |
| 4. Meeting people/socializing | 1 | 2 | 3 | 4 | 5 |
| 5. Mental health stress relief | 1 | 2 | 3 | 4 | 5 |

14. The following is a list of barriers or reasons that people give for not exercising regularly. Please evaluate each item on the list for the degree to which it is a barrier to exercise for you. Please use the following scale to guide your responses.

| | | | | |
|---|---|---|---|---|
| 1<br>minor<br>barrier | 2 | 3<br>moderate<br>barrier | 4 | 5<br>major<br>barrier |

How much of a barrier is each of the following items to you exercising regularly?

| | | | | | |
|---|---|---|---|---|---|
| 1. Lack of time/too busy | 1 | 2 | 3 | 4 | 5 |
| 2. Lack of energy/too tired | 1 | 2 | 3 | 4 | 5 |
| 3. Lack of motivation/desire | 1 | 2 | 3 | 4 | 5 |
| 4. Excessive cost/too expensive | 1 | 2 | 3 | 4 | 5 |
| 5. Lack of convenient facilities | 1 | 2 | 3 | 4 | 5 |

15. The following questions are related to *how much control* you feel you have over your **time for exercise** for the next four months. Please read the questions carefully and circle the number that best represents your current feelings.

a. For me finding the time to exercise regularly for the next four months would be:

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Extremely Easy | | | Moderately Easy/Difficult | | | Extremely Difficult |

b. If I wanted to, I could easily find the time to exercise regularly over the next 4 months.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Strongly Disagree | Moderately Disagree | Slightly Disagree | | Slightly Agree | Moderately Agree | Strongly Agree |

c. How much control do you have over your time for exercise over the next four months?

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Very Little Control | | | Moderate Control | | | Complete Control |

**Thank-you very much for your time and cooperation.**
If you have any further questions, please do not hesitate to contact:
Laurie Hellsten at (780) 492-5427 (hellsten@ualberta.ca)

# Appendix I

## TIMES Item Analysis results for First Validation Study

*Item Statistics for Exercise Importance*

| Item # | Item Description | Item Distribution (percentages) | | | | | Mean | SD | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | | | |
| EP 1-3 | Exercise is not a priority in my life. | 4.1 | 8.6 | 16.7 | 29.1 | 41.5 | 2.95 | 1.13 | 0.65 |
| EP 2-6 | Finding the time to exercise is not important to me. | 4.1 | 8.6 | 14.7 | 25.1 | 47.3 | 3.03 | 1.16 | 0.69 |
| EP 3-11 | Exercise is an important part of my life. | 5.3 | 7.6 | 19.0 | 24.3 | 43.7 | 2.93 | 1.19 | 0.77 |
| SE 3-22 | I reserve time in my daily schedule for exercise activities. | 12.5 | 19.6 | 18.4 | 26.5 | 23.0 | 2.28 | 1.34 | 0.70 |
| ETMPE 4-32 | I feel stressed when I do not find the time for exercise. | 14.1 | 17.6 | 19.6 | 28.3 | 20.4 | 2.23 | 1.34 | 0.61 |
| EP 7-40 | Exercise is among my top priorities. | 10.8 | 18.7 | 25.4 | 19.7 | 25.2 | 2.30 | 1.32 | 0.78 |
| ETMPE 9-61 | I get upset when I miss my exercise activities. | 17.9 | 17.9 | 19.5 | 27.4 | 17.3 | 2.08 | 1.36 | 0.67 |
| EP 11-67 | I do not value exercise. | 2.2 | 2.2 | 5.3 | 13.8 | 76.5 | 3.60 | 0.86 | 0.57 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EP 1-3 refers to the first EP item and is the 3rd item of the TIMES. All negatively worded items have been reversed-coded.

*Item Statistics for Exercise Documentation*

| Item # | Item Description | Item Distribution (percentages) | | | | | Mean | SD | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | | | |
| ED 4-23 | I record the amount of time I spend exercising in a day-timer or on a calendar. | 60.4 | 17.2 | 10.1 | 6.5 | 5.9 | 0.79 | 1.20 | 0.77 |
| ED 5-36 | My exercise schedule is written down. | 56.8 | 17.8 | 8.7 | 7.3 | 9.3 | 0.94 | 1.34 | 0.70 |
| ED 6-45 | I use a day-timer to block out time for exercise. | 57.3 | 21.5 | 9.6 | 8.3 | 3.3 | 0.78 | 1.11 | 0.69 |
| ED 7-52 | I keep an exercise diary, log, or workbook. | 65.0 | 15.6 | 7.3 | 5.1 | 6.9 | 0.73 | 1.21 | 0.73 |
| ED 9-73 | I record my exercise sessions on a calendar. | 61.2 | 17.6 | 9.5 | 6.1 | 5.5 | 0.77 | 1.18 | 0.79 |
| ED 10-77 | I check exercise off my "to do list" as soon as I finish exercising. | 58.9 | 19.2 | 8.7 | 8.1 | 5.1 | 0.80 | 1.19 | 0.59 |
| ED 11-83 | I document my exercise activities. | 58.7 | 19.6 | 10.3 | 5.3 | 6.1 | 0.80 | 1.19 | 0.79 |
| ED 12-86 | I check my "to do lists" frequently so I do not forget to exercise. | 65.7 | 20.3 | 9.1 | 2.8 | 2.2 | 0.55 | 0.93 | 0.55 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., ED 4-23 refers to the fourth ED item and is the 23rd item of the TIMES. All negatively worded items have been reversed-coded.

*Item Statistics for Perceived Ability to Manage Time for Exercise*

| Item # | Item Description | Item Distribution (percentages) | | | | | Mean | SD | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | 0 | 1 | 2 | 3 | 4 | | | |
| EO 1-1 | Because I am disorganized I lack the time for exercise. | 3.1 | 10.4 | 14.5 | 28.3 | 43.6 | 2.99 | 1.13 | 0.43 |
| SE 2-15 | I find it difficult to reschedule my exercise activities when I am not able to exercise at the scheduled time. | 9.0 | 19.6 | 26.5 | 25.3 | 19.6 | 2.27 | 1.24 | 0.45 |
| EO 5-34 | I am often late for my exercise activities. | 1.8 | 8.7 | 15.6 | 27.1 | 46.8 | 3.09 | 1.06 | 0.35 |
| ATES 6-41 | The exercise activities I enjoy are inconvenient because they take up too much time. | 3.9 | 11.2 | 15.2 | 31.0 | 38.7 | 2.90 | 1.15 | 0.48 |
| ATES7-47 | I often miss-out on my exercise activities because I am over-committed. | 9.5 | 15.6 | 19.1 | 27.2 | 28.6 | 2.50 | 1.31 | 0.58 |
| ATES 8-51 | When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | 16.8 | 25.3 | 22.9 | 17.4 | 17.6 | 1.94 | 1.34 | 0.30 |
| ATES 11-68 | I underestimate the time it will take to complete my exercise activities. | 5.7 | 10.5 | 20.4 | 29.1 | 34.3 | 2.76 | 1.20 | 0.34 |
| EP 13-78 | I do not know how to prioritize my activities so that I include exercise. | 7.5 | 9.7 | 18.2 | 21.7 | 42.9 | 2.83 | 1.29 | 0.42 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., SE 2-15 refers to the second SE item and is the 15th item of the TIMES. All negatively worded items have been reversed-coded.

*Item Statistics for Setting Exercise Goals*

| **Item #** | **Item Description** | **Item Distribution (percentages)** | | | | | **Mean** | **SD** | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|---|
| | | **0** | **1** | **2** | **3** | **4** | | | |
| SEG 3-13 | I periodically evaluate my exercise goals to see if they need changing. | 34.4 | 21.6 | 18.1 | 19.3 | 6.7 | 1.42 | 1.31 | 0.66 |
| SEG 6-37 | My exercise goals are unclear. | 8.9 | 18.6 | 19.6 | 26.9 | 26.1 | 2.43 | 1.29 | 0.56 |
| SEG 7-44 | I set short term exercise goals for what I want to accomplish each week. | 33.5 | 27.8 | 18.9 | 13.8 | 6.1 | 1.33 | 1.24 | 0.53 |
| SEG 8-49 | I don't have long term exercise goals. | 13.0 | 17.0 | 15.6 | 20.5 | 33.9 | 2.47 | 1.43 | 0.53 |
| SEG 9-62 | I have short term exercise goals. | 22.3 | 20.7 | 21.3 | 24.3 | 11.5 | 1.83 | 1.33 | 0.68 |
| SEG 10-65 | I have seasonal exercise goals. | 22.4 | 15.4 | 20.7 | 25.2 | 16.3 | 1.98 | 1.40 | 0.45 |
| SEG 11-72 | I set challenging exercise goals for myself. | 17.8 | 20.4 | 21.0 | 24.4 | 16.4 | 2.01 | 1.35 | 0.63 |
| SEG 13-84 | I revise my exercise goals when needed. | 27.9 | 19.4 | 19.4 | 24.5 | 8.9 | 1.67 | 1.34 | 0.69 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., SEG 3-13 refers to the third SEG item and is the 13th item of the TIMES. All negatively worded items have been reversed-coded.

# Appendix J

## Second Empirical Validation Package

## Time Management Exercise Scale – TIMES

The TIMES is an instrument intended to measure time management behaviors in relation to exercise participation and adherence. There are many definitions of exercise, however, I would like you use the following definition of exercise to help you complete this questionnaire:

> **Exercise is planned, structured, and involves bodily movement with the specific *intention* of improving or maintaining one or more components of physical fitness such as aerobic fitness, muscular strength and endurance, body composition, or flexibility (Caspersen, Powell, & Christenson, 1985).**

There is often confusion surrounding the definition of exercise. Here is an example of what is not and what is considered exercise for this study:

"You park your car in a parkade several blocks from your work and walk those blocks to work each weekday because that is the only parkade available. You may be improving or maintaining one or more components of physical fitness in the process but those fitness results are **unintentional**." This **would not** be considered exercise.

"Although there is a parkade one block from your office, you park your car in a parkade several blocks from your work on purpose and walk those blocks to work each weekday because you want to fit more exercise into your life. You are **intentionally** trying to improve or maintain one or more components of physical fitness in the process." This **would be** considered exercise.

Each of the 37 statements on the next two pages refers to a time management behavior or reaction. For each item, you will be asked to rate how well the item describes **you** *at this time in your life.*

Read each statement carefully and then using the scale ranging from "Does not describe me at all" to "Describes me very well", check the box (√) that best represents how well the statement describes **you** *at this time in your life.* For example, if you are uncertain as to whether you would like to go swimming, you would check off the third box. If you don not perform the time management behavior indicated by the item, check the box: "does not describe me at all". Please note that there are no correct or incorrect answers. Your first response is usually the best one.

**EXAMPLE:** I like to go swimming.

| **DOES NOT DESCRIBE ME AT ALL** | | | | **DESCRIBES ME VERY WELL** |
|---|---|---|---|---|
| ☐ | ☐ | √ | ☐ | ☐ |

| TIMES ITEMS | DOES NOT DESCRIBE ME AT ALL | | | | DESCRIBES ME VERY WELL |
|---|---|---|---|---|---|
| 1. I lack the time to exercise because I am disorganized. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. Exercise is not a priority in my life. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. I set goals for my exercise participation and adherence. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. Finding the time to exercise is not important to me. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. I check exercise off of my "to do list" when I finish exercising. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 6. I evaluate my exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. I reserve time in my daily schedule for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. I record the amount of time I spend exercising in a day-timer or on a calendar. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. I feel stressed when I do not find the time to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. I am never late for my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. I write my exercise schedule down. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. My exercise goals are unclear. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. Exercise is among my top priorities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. The exercise activities I enjoy are inconvenient because they take up too much time. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. I use a day-timer to block out time for exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 18. I set short term exercise goals for what I want to accomplish each week. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 19. I often miss-out on my exercise activities because I am over-committed. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. I don't set long term exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |

| TIMES ITEMS | DOES NOT DESCRIBE ME AT ALL | | | | DESCRIBES ME VERY WELL |
|---|---|---|---|---|---|
| 21. When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. I keep an exercise log or diary. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. I set short term exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. I feel upset when I miss my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. I set seasonal exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 26. I don't value exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 27. I underestimate the time it takes to complete my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 28. I set challenging exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 29. I record my exercise sessions on a calendar. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 30. I make exercise an important part of my life. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 31. I know how to prioritize my activities to include exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32. I document my exercise activities. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33. I revise my exercise goals. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34. I check my "to do lists" frequently so I don't forget to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 35. I set exercise goals that are reasonable for me. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36. I accurately estimate the amount of time it takes me to exercise. | ☐ | ☐ | ☐ | ☐ | ☐ |
| 37. I prepare the things I need for my exercise activities ahead of time. | ☐ | ☐ | ☐ | ☐ | ☐ |

## Background Information

12. What is your gender? (please circle one)

(a) Female (b) Male

13. What is your date of birth? (Day/Month/Year)____________________________

14. What is your highest level of education? (please circle one)

(a) High School (b) Some university
(c) B.Sc. (d) B. A.
(e) Master's (f) Ph.D.
(g) Other (please specify) ________________________________________

15. What is your marital status? (please circle one)

(a) Never Married (b) Married
(c) Common Law (d) Separated
(e) Divorced (f) Widowed

5. What is your registration status at the University of Alberta? (please circle one)

(c) Full-time (3 or more courses per term)
(d) Part-time (less than 3 courses per term)

6. Are you currently employed (paid employment or homemaker)? (please circle one)

(c) Yes
(d) No

If "yes", where? ________________________________________________

If "yes", how many hours per week do you work? (please circle one)

(a) None (b) 1 - 5 hours
(c) 6 - 10 hours (d) 11 - 15 hours
(e) 16 - 20 hours (f) 21 - 25 hours
(g) 26 - 30 hours (h) 31 - 35 hours
(i) 36 - 40 hours (j) more than 40 hours

7. Do you currently do any volunteer work? (please circle one)

   (c) Yes
   (d) No

   If "yes", how many hours per week do you volunteer? (please circle one)

   (a) None
   (b) 1 - 5 hours
   (c) 6 - 10 hours
   (d) 11 - 15 hours
   (e) 16 - 20 hours
   (f) 21 - 25 hours
   (g) 26 - 30 hours
   (h) 31 - 35 hours
   (i) 36 - 40 hours
   (j) more than 40 hours

8. How many hours per week do you spend studying? (please circle one)

   (a) None
   (b) 1 - 5 hours
   (c) 6 - 10 hours
   (d) 11 - 15 hours
   (e) 16 - 20 hours
   (f) 21 - 25 hours
   (g) 26 - 30 hours
   (h) 31 - 35 hours
   (i) 36 - 40 hours
   (j) more than 40 hours

9. Do you have any formal time management experience (i.e. workshops/seminars)?
   (c) Yes (please circle one)
   (d) No

   If "yes", circle all that apply:

   (e) workshops/seminars offered by University of Alberta
   (f) workshops/seminars offered by your employer
   (g) off-campus workshops/seminars
   (h) other; please explain ______________________________
   ______________________________
   ______________________________
   ______________________________

10. Do you have any informal time management training (i.e. books/videos)?

   (c) Yes (please circle one)
   (d) No

   If "yes", circle all that apply:

   (e) read books on time management
   (f) watched videos on time management
   (g) watched television programs (i.e. knowledge network, OPRAH)
   (h) other; please explain ______________________________
   ______________________________
   ______________________________

11. The next two questions ask you about regular exercise. When answering these questions please remember the following definition of exercise used in the study:

**Exercise is planned, structured, and involves bodily movement with the specific *intention* of improving or maintaining one or more components of physical fitness such as aerobic fitness, muscular strength and endurance, body composition, or flexibility (Caspersen, Powell, & Christenson, 1985). This activity should be performed *3 or more times* per week for *20 or more minutes* per session at a level that increases your breathing rate and causes you to break a sweat.**

---

***Do you exercise regularly according to the definition above?***

Please check the one statement that applies to you.

1. Yes, I have been exercising regularly for more than 6 months. ________
2. Yes, I have been exercising regularly, but for less than 6 months. ________
3. No, but I intend to exercise regularly in the next 30 days. ________
4. No, but I intend to exercise regularly in the next 6 months. ________
5. No, and I do not intend to exercise regularly in the next 6 months. ________

---

**Consider a typical week (7 days) during the past 4 months.**
**How many times, on the average, did you do the following kinds**
**of exercise for more than 20 minutes during your free time?**

TIMES PER
WEEK

a. STRENUOUS EXERCISE
(HEART BEATS RAPIDLY, BREATHING HEAVY) ____________

b. MODERATE EXERCISE
(HEART BEAT ACCELERATES, NOT EXHAUSTING) ____________

c. MILD EXERCISE
(HEART RATE NORMAL, MINIMAL EFFORT) ____________

12. The following is a list of motives or reasons that people often give for exercising. Please evaluate each item on the list for the degree to which it is an important motive or reason for you to exercise. Please use the following scale to guide your responses.

| | | | | |
|---|---|---|---|---|
| 1<br>minor<br>importance | 2 | 3<br>moderate<br>importance | 4 | 5<br>major<br>importance |

How important would each of the following reasons be in your decision to exercise?

| | | | | | |
|---|---|---|---|---|---|
| 1. Fitness and health | 1 | 2 | 3 | 4 | 5 |
| 2. Physical appearance | 1 | 2 | 3 | 4 | 5 |
| 3. Weight control | 1 | 2 | 3 | 4 | 5 |
| 4. Meeting people/socializing | 1 | 2 | 3 | 4 | 5 |
| 5. Mental health stress relief | 1 | 2 | 3 | 4 | 5 |

13. The following is a list of barriers or reasons that people give for not exercising regularly. Please evaluate each item on the list for the degree to which it is a barrier to exercise for you. Please use the following scale to guide your responses.

| | | | | |
|---|---|---|---|---|
| 1<br>minor<br>barrier | 2 | 3<br>moderate<br>barrier | 4 | 5<br>major<br>barrier |

How much of a barrier is each of the following items to you exercising regularly?

| | | | | | |
|---|---|---|---|---|---|
| 1. Lack of time/too busy | 1 | 2 | 3 | 4 | 5 |
| 2. Lack of energy/too tired | 1 | 2 | 3 | 4 | 5 |
| 3. Lack of motivation/desire | 1 | 2 | 3 | 4 | 5 |
| 4. Excessive cost/too expensive | 1 | 2 | 3 | 4 | 5 |
| 5. Lack of convenient facilities | 1 | 2 | 3 | 4 | 5 |

14. The following questions are related to *how much control* you feel you have over your **time for exercise** for the next four months. Please read the questions carefully and circle the number that best represents your current feelings.

a. For me, finding the time to exercise regularly for the next four months would be:

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Extremely Easy | | | Moderately Easy/Difficult | | | Extremely Difficult |

b. If I wanted to, I could easily find the time to exercise regularly over the next 4 months.

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Strongly Disagree | Moderately Disagree | Slightly Disagree | | Slightly Agree | Moderately Agree | Strongly Agree |

c. How much control do you have over your time for exercise over the next four months?

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Very Little Control | | | Moderate Control | | | Complete Control |

**Thank-you very much for your time and cooperation.**

If you have any further questions, please do not hesitate to contact:

Laurie Hellsten at (780) 492-3763 (hellsten@ualberta.ca)

# Appendix K

## TIMES Item Analysis Results for Second Validation Study Sample 1 *(k=35)*

Item Statistics for Setting Exercise Goals

| **Item** | **Item Distribution (percentages)** | | | | | **Mean** | **(SD)** | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | | | |
| SEG 2-6. I evaluate my exercise goals. | 33.5 | 19.1 | 23.7 | 15.8 | 7.9 | 1.45 | 1.33 | 0.70 |
| SEG 3-10*. I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | 36.7 | 17.2 | 13.0 | 19.1 | 14.0 | 1.56 | 1.49 | 0.73 |
| SEG 5-18. I set short term exercise goals for what I want to accomplish each week. | 44.9 | 22.4 | 15.9 | 12.6 | 4.2 | 1.09 | 1.24 | 0.62 |
| SEG 6-20. I don't set long term exercise goals. | 24.3 | 18.2 | 15.4 | 21.0 | 21.0 | 1.97 | 1.50 | 0.51 |
| SEG 7-23. I set short term exercise goals. | 32.7 | 18.7 | 17.3 | 22.4 | 8.9 | 1.55 | 1.39 | 0.71 |
| SEG 8-25. I set seasonal exercise goals. | 27.4 | 15.1 | 20.3 | 25.9 | 11.3 | 1.80 | 1.40 | 0.51 |
| SEG 9-28. I set challenging exercise goals. | 25.2 | 18.2 | 20.6 | 26.6 | 9.3 | 1.77 | 1.34 | 0.70 |
| SEG 10-33. I revise my exercise goals. | 39.2 | 16.5 | 22.2 | 17.9 | 4.2 | 1.33 | 1.28 | 0.75 |
| SEG 11-35*. I set exercise goals that are reasonable for me. | 15.1 | 11.3 | 19.8 | 37.3 | 16.5 | 2.28 | 1.31 | 0.66 |
| PAMTE 9-36*. I accurately estimate the time it takes me to exercise. | 16.0 | 17.5 | 19.3 | 32.5 | 14.6 | 2.14 | 1.31 | 0.54 |
| PAMTE 10-37*. I prepare the things I need for my exercise activities ahead of time. | 16.8 | 10.3 | 20.1 | 27.1 | 25.7 | 2.36 | 1.40 | 0.56 |

*Note*. Items are identified by subscale number and overall number with lie items *removed*, i.e., SEG 3-10 refers to the third SEG item and is the 10th item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for Exercise Documentation

| Item | Item Distribution (percentages) | | | | | Mean | (SD) | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | | | |
| ED 1-5. I check exercise off of my "to do list" when I finish exercising. | 52.1 | 11.6 | 15.8 | 12.6 | 7.9 | 1.13 | 1.37 | 0.50 |
| ED 2-9. I record the amount of time I spend exercising in a day-timer or on a calendar. | 70.7 | 14.0 | 5.6 | 4.2 | 5.6 | 0.60 | 1.13 | 0.78 |
| ED 3-13. I write my exercise schedule down. | 54.9 | 18.6 | 15.3 | 6.0 | 5.1 | 0.88 | 1.18 | 0.80 |
| ED 4-17. I use a day-timer to block out time for exercise. | 59.5 | 18.6 | 9.3 | 7.9 | 4.7 | 0.80 | 1.18 | 0.78 |
| ED 5-22. I keep an exercise log or diary. | 67.8 | 16.8 | 6.5 | 4.7 | 4.2 | 0.61 | 1.08 | 0.70 |
| ED 6-29. I record my exercise sessions on a calendar. | 63.2 | 16.5 | 11.3 | 4.7 | 4.2 | 0.70 | 1.11 | 0.84 |
| ED 7-32. I document my exercise activities. | 58.9 | 17.8 | 12.6 | 6.1 | 4.7 | 0.80 | 1.16 | 0.84 |
| ED 8-34. I check my "to do lists" frequently so I don't forget to exercise. | 57.5 | 21.0 | 8.9 | 8.9 | 3.7 | 0.80 | 1.15 | 0.74 |

*Note*. Items are identified by subscale number and overall number with lie items *removed*, i.e., ED 1-5 refers to the first ED item and is the 5th item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for Perceived Ability to Manage Time for Exercise

| **Item** | **Item Distribution (percentages)** | | | | | **Mean** | **(SD)** | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | | | |
| PAMTE 2-7. I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | 19.1 | 25.6 | 21.9 | 12.1 | 21.4 | 1.91 | 1.41 | 0.23 |
| SEG 4-14. My exercise goals are unclear. | 15.3 | 22.8 | 25.1 | 20.5 | 16.3 | 1.99 | 1.30 | 0.27 |
| PAMTE 4-16. The exercise activities I enjoy are inconvenient because they take up too much time. | 5.6 | 16.7 | 14.4 | 30.7 | 32.6 | 2.68 | 1.24 | 0.43 |
| PAMTE 5-19. I often miss-out on my exercise activities because I am over-committed. | 16.7 | 26.5 | 19.5 | 16.7 | 20.5 | 1.98 | 1.39 | 0.49 |
| PAMTE 6-21. When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | 26.6 | 26.6 | 19.2 | 11.7 | 15.9 | 1.64 | 1.40 | 0.23 |
| PAMTE 7-27. I underestimate the time it takes to complete my exercise activities. | 5.1 | 16.8 | 22.9 | 27.6 | 27.6 | 2.56 | 1.20 | 0.35 |

*Note*. Items are identified by subscale number and overall number with lie items *removed*, i.e., PAMTE 2-7 refers to the second PAMTE item and is the 7th item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for Exercise Importance

| Item | Item Distribution (percentages) | | | | | Mean | (SD) | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | | | |
| EI 1-2. Exercise is not a priority in my life. | 5.1 | 12.6 | 16.3 | 31.6 | 34.4 | 2.78 | 1.19 | 0.67 |
| SEG 1-3*. I set goals for my exercise participation and adherence. | 15.8 | 22.3 | 22.8 | 26.0 | 13.0 | 2.84 | 1.22 | 0.59 |
| EI 2-4. Finding the time to exercise is not important to me. | 6.1 | 11.2 | 14.5 | 30.4 | 37.9 | 2.83 | 1.22 | 0.59 |
| EI 3-8. I reserve time in my daily schedule for exercise. | 22.3 | 21.4 | 15.8 | 24.2 | 16.3 | 1.91 | 1.41 | 0.71 |
| EI 4-11. I feel stressed when I do not find the time to exercise. | 16.3 | 14.4 | 15.3 | 33.5 | 20.5 | 2.27 | 1.37 | 0.66 |
| EI 5-15. Exercise is among my top priorities. | 17.2 | 20.0 | 23.7 | 22.8 | 16.3 | 2.01 | 1.33 | 0.83 |
| EI 6-24. I feel upset when I miss my exercise activities. | 18.7 | 14.0 | 20.6 | 26.2 | 20.6 | 2.16 | 1.40 | 0.69 |
| EI 7-26. I don't value exercise. | 1.9 | 4.2 | 7.0 | 22.4 | 64.5 | 3.43 | 0.93 | 0.59 |
| EI 8-30. I make exercise an important part of my life. | 9.4 | 12.2 | 29.6 | 25.4 | 23.5 | 2.41 | 1.24 | 0.80 |
| PAMTE 8-31. I know how to prioritize my activities to include exercise. | 17.0 | 20.8 | 25.9 | 23.6 | 12.7 | 1.95 | 1.28 | 0.68 |

*Note*. Items are identified by subscale number and overall number with lie items *removed*, i.e., EI 2-4 refers to the second EI item and is the 4th item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

# Appendix L

## TIMES Item Analysis Results for Second Validation Study Sample 2 (*k=35)*

Item Statistics for Exercise Importance

| **Item** | **Item Distribution (percentages)** | | | | | **Mean** | **(SD)** | **$r_{xx}$** |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | | | |
| EI 1-2. Exercise is not a priority in my life. | 4.2 | 18.1 | 15.3 | 22.8 | 39.5 | 2.75 | 1.26 | 0.71 |
| SEG 1-3*. I set goals for my exercise participation and adherence. | 12.6 | 21.9 | 19.5 | 32.6 | 13.5 | 2.12 | 1.25 | 0.69 |
| EI 2-4. Finding the time to exercise is not important to me. | 6.0 | 8.8 | 16.7 | 30.2 | 38.1 | 2.84 | 1.21 | 0.60 |
| EI 3-8. I reserve time in my daily schedule for exercise. | 20.5 | 22.3 | 18.6 | 22.3 | 16.3 | 1.91 | 1.38 | 0.74 |
| EI 4-11. I feel stressed when I do not find the time to exercise. | 20.0 | 12.1 | 16.3 | 28.8 | 22.8 | 2.22 | 1.45 | 0.66 |
| EI 5-15. Exercise is among my top priorities. | 14.9 | 20.9 | 28.4 | 19.1 | 16.7 | 2.00 | 1.29 | 0.83 |
| EI 6-24. I feel upset when I miss my exercise activities. | 19.8 | 14.6 | 18.9 | 25.9 | 20.8 | 2.13 | 1.42 | 0.73 |
| EI 7-26. I don't value exercise. | 3.3 | 5.2 | 10.8 | 23.1 | 57.5 | 3.25 | 1.06 | 0.65 |
| SEG 9-28. I set challenging exercise goals. | 22.9 | 18.2 | 26.6 | 21.0 | 11.2 | 1.80 | 1.32 | 0.69 |
| EI 8-30. I make exercise an important part of my life. | 10.3 | 13.6 | 25.4 | 26.3 | 24.4 | 2.40 | 1.28 | 0.85 |
| PAMTE 8-31. I know how to prioritize my activities to include exercise. | 17.9 | 18.9 | 27.4 | 25.0 | 10.8 | 1.93 | 1.26 | 0.66 |
| SEG 11-35*. I set exercise goals that are reasonable for me. | 17.3 | 9.3 | 22.4 | 37.4 | 13.6 | 2.18 | 1.29 | 0.73 |
| PAMTE 9-36*. I accurately estimate the amount of time it takes me to exercise. | 20.1 | 15.0 | 18.2 | 31.8 | 15.0 | 2.08 | 1.37 | 0.65 |
| PAMTE 10-37*. I prepare the things I need for my exercise activities ahead of time. | 20.7 | 16.0 | 16.0 | 24.4 | 23.0 | 2.11 | 1.46 | 0.61 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EI 1-2 refers to the first EI item and is the 2nd item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for Exercise Documentation

| Item | Item Distribution (percentages) | | | | | Mean | (SD) | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | | | |
| ED 1-5. I check exercise off of my "to do list" when I finish exercising. | 51.2 | 9.8 | 12.1 | 11.2 | 15.8 | 1.31 | 1.56 | 0.57 |
| ED 2-9. I record the amount of time I spend exercising in a day-timer or on a calendar. | 65.4 | 13.6 | 7.9 | 7.9 | 5.1 | 0.74 | 1.20 | 0.79 |
| ED 3-13. I write my exercise schedule down. | 49.8 | 18.1 | 12.6 | 12.6 | 7.0 | 1.098 | 1.31 | 0.72 |
| ED 4-17. I use a day-timer to block out time for exercise. | 53.7 | 22.4 | 9.3 | 8.9 | 5.6 | 0.90 | 1.22 | 0.67 |
| ED 5-22. I keep an exercise log or diary. | 64.5 | 15.9 | 9.3 | 5.6 | 4.7 | 0.71 | 1.15 | 0.71 |
| SEG 8-25. I set seasonal exercise goals. | 32.4 | 19.7 | 15.5 | 23.0 | 9.4 | 1.61 | 1.28 | 0.49 |
| ED 6-29. I record my exercise sessions on a calendar. | 60.4 | 16.5 | 8.0 | 9.9 | 5.2 | 0.83 | 1.24 | 0.76 |
| ED 7-32. I document my exercise activities. | 53.1 | 22.5 | 10.3 | 8.9 | 5.2 | 0.92 | 1.21 | 0.81 |
| ED 8-34. I check my "to do lists" frequently so I don't forget to exercise. | 55.6 | 19.6 | 12.6 | 8.4 | 3.7 | 0.87 | 1.16 | 0.67 |

Note. Items are identified by subscale number and overall number with lie items *removed*, i.e., ED 1-5 refers to the first ED item and is the 5th item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for Perceived Ability to Manage Time for Exercise

| Item | Item Distribution (percentages) | | | | | Mean | (SD) | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | | | |
| PAMTE 2-7. I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | 21.0 | 24.3 | 17.8 | 17.3 | 19.6 | 1.90 | 1.43 | 0.47 |
| PAMTE 4-16. The exercise activities I enjoy are inconvenient because they take up too much time. | 7.9 | 17.2 | 17.2 | 29.3 | 28.4 | 2.52 | 1.28 | 0.45 |
| PAMTE 5-19. I often miss-out on my exercise activities because I am over-committed. | 19.5 | 25.1 | 14.9 | 20.0 | 20.5 | 1.96 | 1.43 | 0.53 |
| PAMTE 6-21. When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | 27.1 | 32.2 | 16.4 | 9.3 | 15.0 | 1.53 | 1.38 | 0.39 |
| PAMTE 7-27. I underestimate the time it takes to complete my exercise activities. | 8.4 | 14.5 | 23.4 | 22.4 | 31.3 | 2.53 | 1.29 | 0.36 |

*Note*. Items are identified by subscale number and overall number with lie items *removed*, i.e., PAMTE 2-7 refers to the second PAMTE item and is the 7th item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for Setting Exercise Goals

| Item | Item Distribution (percentages) | | | | | Mean | (SD) | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | | | |
| SEG 2-6. I evaluate my exercise goals. | 31.3 | 21.0 | 22.0 | 16.8 | 8.9 | 1.50 | 1.32 | 0.77 |
| SEG 3-10*. I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | 35.3 | 17.7 | 17.2 | 17.2 | 12.6 | 1.54 | 1.44 | 0.67 |
| SEG 4-14. My exercise goals are unclear. | 15.8 | 17.2 | 25.6 | 22.8 | 18.6 | 2.12 | 1.33 | 0.56 |
| SEG 5-18. I set short term exercise goals for what I want to accomplish each week. | 38.7 | 24.5 | 18.4 | 11.8 | 6.6 | 1.22 | 1.26 | 0.64 |
| SEG 6-20. I don't set long term exercise goals. | 20.5 | 19.1 | 20.9 | 21.4 | 18.1 | 2.00 | 1.40 | 0.50 |
| SEG 7-23. I set short term exercise goals. | 28.5 | 18.2 | 25.7 | 20.6 | 7.0 | 1.60 | 1.29 | 0.73 |
| SEG 10-33. I revise my exercise goals. | 36.2 | 23.9 | 20.7 | 14.1 | 5.2 | 1.30 | 1.24 | 0.71 |

*Note*. Items are identified by subscale number and overall number with lie items *removed*, i.e., SEG 2-6 refers to the second SEG item and is the 6th item of the second draft of the TIMES. All negatively worded items have been reversed-coded.

# Appendix M

## TIMES Item Analysis Results for Second Validation Study Complete Sample
## ($N = 430$; $k = 29$)

Item Statistics for the TIMES (3rd ed.)

| Item | Item Distribution (percentages) | | | | | *M* | *SD* | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | | | |
| **Exercise Importance** | | | | | | | | |
| EI 1-2. Exercise is not a priority in my life. | 2.7 | 7.2 | 17.2 | 22.9 | 49.9 | 2.76 | 1.23 | 0.70 |
| EI 2-4. Finding the time to exercise is not important to me. | 3.3 | 8.5 | 11.5 | 22.8 | 54.0 | 2.84 | 1.22 | 0.60 |
| EI 3-8. I reserve time in my daily schedule for exercise. | 32.4 | 20.0 | 19.7 | 19.7 | 8.2 | 1.92 | 1.40 | 0.71 |
| EI 4-11. I feel stressed when I do not find the time to exercise. | 24.2 | 15.2 | 21.7 | 28.2 | 10.7 | 2.25 | 1.41 | 0.64 |
| EI 5-15. Exercise is among my top priorities. | 27.4 | 23.9 | 20.9 | 19.2 | 8.5 | 2.01 | 1.32 | 0.83 |
| EI 6-24. I feel upset when I miss my exercise activities. | 19.0 | 13.5 | 20.5 | 26.0 | 21.0 | 2.14 | 1.41 | 0.72 |
| EI 7-26. I don't value exercise. | 1.0 | 3.7 | 5.7 | 16.5 | 73.1 | 3.35 | 1.00 | 0.63 |
| EI 8-30. I make exercise an important part of my life. | 17.0 | 18.2 | 27.9 | 25.2 | 11.7 | 2.41 | 1.26 | 0.82 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., EI 1-2 refers to the first EI item and is the 2nd item of the TIMES; All negatively worded items have been reversed-coded.

Item Statistics for the TIMES (3rd ed.) continued

| Item | Item Distribution (percentages) | | | | | $M$ | $SD$ | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | | | |
| **Exercise Documentation** | | | | | | | | |
| ED 1-5. I check exercise off of my "to do list" when I finish exercising. | 56.5 | 11.5 | 14.0 | 14.0 | 4.0 | 1.21 | 1.47 | 0.53 |
| ED 2-9. I record the amount of time I spend exercising in a day-timer or on a calendar. | 75.1 | 11.0 | 6.7 | 4.7 | 2.5 | 0.67 | 1.17 | 0.79 |
| ED 3-13. I write my exercise schedule down. | 61.1 | 16.0 | 14.0 | 6.2 | 2.7 | 0.99 | 1.25 | 0.76 |
| ED 4-17. I use a day-timer to block out time for exercise. | 68.3 | 13.7 | 9.0 | 6.7 | 2.2 | 0.86 | 1.20 | 0.72 |
| ED 5-22. I keep an exercise log or diary. | 74.1 | 12.7 | 6.5 | 4.7 | 2.0 | 0.66 | 1.11 | 0.70 |
| ED 6-29. I record my exercise sessions on a calendar. | 71.1 | 11.7 | 10.5 | 4.7 | 2.0 | 0.77 | 1.18 | 0.80 |
| ED 7-32. I document my exercise activities. | 67.6 | 13.5 | 11.2 | 5.2 | 2.5 | 0.86 | 1.19 | 0.82 |
| ED 8-34. I check my "to do lists" frequently so I don't forget to exercise. | 66.8 | 16.5 | 8.7 | 6.0 | 2.0 | 0.84 | 1.16 | 0.71 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., ED 1-5 refers to the first ED item and is the59th item of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for the TIMES (3rd Ed.) continued

| | Item Distribution (percentages) | | | | | $M$ | $SD$ | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | | | |
| **Setting Exercise Goals** | | | | | | | | |
| SEG 2-6. I evaluate my exercise goals. | 43.9 | 19.7 | 20.0 | 12.2 | 4.2 | 1.47 | 1.32 | 0.74 |
| SEG 3-10*. I set specific exercise goals (e.g. I am going to jog a mile every morning at 7 AM) rather than general exercise goals (e.g. I am going to start exercising more often). | 36.0 | 17.4 | 15.1 | 18.1 | 13.3 | 1.55 | 1.46 | 0.72 |
| SEG 5-18. I set short term exercise goals for what I want to accomplish each week. | 54.1 | 20.0 | 14.0 | 9.7 | 2.2 | 1.16 | 1.25 | 0.64 |
| SEG 6-20. I don't set long term exercise goals. | 12.0 | 18.7 | 16.5 | 21.4 | 31.4 | 1.98 | 1.45 | 0.49 |
| SEG 7-23. I set short term exercise goals. | 40.1 | 21.7 | 19.5 | 14.2 | 4.5 | 1.58 | 1.34 | 0.73 |
| SEG 9-28. I set challenging exercise goals. | 32.7 | 22.4 | 21.2 | 19.2 | 4.5 | 1.79 | 1.32 | 0.71 |
| SEG 10-33. I revise my exercise goals. | 49.6 | 18.5 | 18.7 | 11.0 | 2.2 | 1.31 | 1.26 | 0.74 |
| SEG 11-35*. I set exercise goals that are reasonable for me. | 16.2 | 10.3 | 21.1 | 37.3 | 15.0 | 2.24 | 1.29 | 0.64 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., SEG 2-6 refers to the second SEG item and is the 6th item of the TIMES. All negatively worded items have been reversed-coded.

Item Statistics for the TIMES (3rd Ed.) continued

| | Item Distribution (percentages) | | | | | $M$ | $SD$ | $r_{xx}$ |
|---|---|---|---|---|---|---|---|---|
| | **0** | **1** | **2** | **3** | **4** | | | |
| **Perceived Ability to Manage Time for Exercise** | | | | | | | | |
| PAMTE 2-7. I find it difficult to reschedule my exercise when I can't exercise at my scheduled time. | 9.5 | 23.2 | 24.2 | 13.5 | 29.7 | 1.90 | 1.42 | 0.47 |
| PAMTE 4-16. The exercise activities I enjoy are inconvenient because they take up too much time. | 2.7 | 12.0 | 15.7 | 23.4 | 46.1 | 2.60 | 1.27 | 0.39 |
| PAMTE 5-19. I often miss-out on my exercise activities because I am over-committed. | 8.2 | 23.4 | 22.9 | 14.5 | 30.9 | 1.97 | 1.41 | 0.49 |
| PAMTE 6-21. When I am very busy, I reallocate the time I set aside for exercise in order to do something else. | 13.2 | 27.2 | 25.9 | 13.5 | 20.2 | 1.58 | 1.39 | 0.42 |
| PAMTE 7-27. I underestimate the time it takes to complete my exercise activities. | 2.5 | 12.2 | 19.2 | 25.2 | 40.9 | 2.54 | 1.24 | 0.38 |

*Note.* Items are identified by subscale number and overall number with lie items *removed*, i.e., PAMTE 2-7 refers to the second PAMTE item and is the 7th item of the TIMES. All negatively worded items have been reversed-coded.